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ABSTRACT

The specific objective of the research described in this report was to develop guidelines for decisionmaking by the Office of Manpower Utilization (OMU), Marine Corps Headquarters, in the selection of occupational field (OF) sample sizes to which task inventories will be administered. The report is designed to provide action-oriented answers to major questions about both size of samples to be drawn and the strategy for planning and conducting the data collection process. Generally accepted essential requirements for the design of optimum samples are discussed and major implications of these requirements are spelled out as they apply to samples in Task Analysis (TA). A summary of requirements for a sampling design for OMU is given along with research findings that suggest a uniform optimum size for OMU samples. A recommended sampling strategy is also outlined for guidance in data collection. The appendixes, covering half the document, present in tabular form data from stability tests conducted in the analysis of responses to different occupational field task analysis inventories. (Author/HD)

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GUIDELINES FOR SAMPLING IN MARINE CORPS TASK ANALYSIS

William T. Farrell, C. Harold Stone
and Dale Yoder

Technical Report No. 11

EVALUATION OF THE MARINE CORPS
TASK ANALYSIS PROGRAM

A Research Project Supported By
Commandant of the Marine Corps (Code RD)
And Monitored By
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The main focus of Marine Corps Task Analysis (TA) is upon occupational fields (OFs). Data for analysis in the TA process are gathered by the administration of a Task Analysis Inventory to a sample of Marines in the OF being studied. It has been the policy of the Office of Manpower Utilization, HQMC (OMU), which conducts the TA program, to administer a task inventory to the largest possible sample in an OF. The specific objective of the research described in this report was to develop guidelines for decision-making by the OMU staff in the selection of OF sample sizes to which task

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inventories will be administered. Generally accepted essential requirements for the design of an optimum sample are discussed. Major implications of these requirements are spelled out as they apply to samples in Task Analysis. A summary of requirements for a sampling design for OMU is given. Research findings are reported that suggest a uniform optimum size for OMU samples, and a recommended sampling strategy is outlined for guidance in data collection.

SUMMARY

The main focus of Marine Corps Task Analysis (TA) is upon occupational fields (OFs). Data for analysis in the TA process are gathered by the administration of a Task Analysis Inventory to a sample of Marines in the OF being studied. Occupational fields in the Marine Corps may vary in size from those with only a few hundred Marines assigned to them to others that number in the thousands.

Every TA project leans heavily on a sampling procedure to generate its essential, basic data. It has been the policy of the Office of Manpower Utilization, HQMC (OMU), which conducts the TA program, to administer a task inventory to the largest possible sample in an OF. This has led to sample sizes that are in excess of statistical requirements for effective analysis and created greater costs for administering and scoring inventories than may be necessary.

The specific objective of the research described in this report was to develop guidelines for decision-making by the OMU staff in the selection of OF sample sizes to which task inventories will be administered. The report has been designed to provide action-oriented answers to major questions about both size of the samples to be drawn and the most promising strategy for planning and conducting the data-collection process.

Generally accepted essential requirements for the design of an optimum sample are discussed. Major implications of these requirements are spelled out as they apply to samples in Task Analysis. A summary of requirements for a sampling design for OMU is given. Research findings are reported that suggest a uniform optimum size for OMU samples, and a recommended sampling strategy is outlined for guidance in data collection.

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I

INTRODUCTION

The main focus of Marine Corps Task Analysis (TA) is upon occupational fields (OFs). Data for analysis in the TA process are gathered by administration of a Task Analysis Inventory to a sample of Marines in the OF being studied. The inventories provide the means for Marines to indicate the tasks they actually perform on their jobs within the OF and the percentage of time spent on each. Occupational fields in the Marine Corps vary in size from those with only a few hundred Marines assigned to them to others that number in the thousands.

It has been the policy of the Office of Manpower Utilization, HQMC (OMU), which conducts the TA program, to administer a task inventory to the largest possible sample in an OF. Our studies show it has not been uncommon for the sample to include as high as 22 percent of the personnel in a large field, and to be as high as 70 percent in an OF with only a few hundred incumbents. The ramifications of this policy extend to sample sizes that appear to be in excess of statistical requirements for effective analysis and create greater costs for administering and scoring inventories than may be necessary.

The specific objective of the research described in this report was to develop guidelines for decision-making by the OMU staff in the selection of OF sample sizes to which task analysis inventories will be administered.

Advantages and disadvantages associated with various levels of N were to be specified as they relate to OMU priorities and practices. Potential effects of variations in methods of drawing samples, and sample characteristics which may significantly affect response reliability, were also to be identified.

Every Task Analysis project leans heavily on a sampling procedure to generate its essential, basic data. Those conducting the study must plan, develop and implement a sampling process to discover the all-important facts about what Marines in the OF being studied actually do in the performance of the jobs to which they are assigned. For this reason OMU must answer questions about the sampling process as a prelude to the data-gathering stage in Task Analysis.

A preliminary and basic question concerns the optimal size of the sample to be taken in collecting data. The answer to this question depends, in part, upon clear recognition of the essential requirements of an adequate sample and, in part, on decisions that define the methods, procedures and strategies with which sample data are collected. Decisions with respect to both sample size and sampling strategies are of great importance, because they affect the credibility and value of findings and recommendations. An otherwise well-conceived program of research may lose credibility if the sample does not meet the requirements imposed by the research problem.

The purposes of this technical report are:

1. To discuss the required characteristics of an optimum sample design.
2. To present findings which provide an empirical basis for defining a general sample size.

3. To recommend a generalized sampling strategy for OMU to use in Task Analysis studies of Marine Corps Occupational Fields.

This report suggests general conclusions regarding optimum sample size and outlines guidelines for an acceptable sampling strategy. PART II specifies and discusses three generally recognized essential requirements for the design of an optimum sample. PART III spells out major implications of these requirements as they apply to samples in Task Analysis. PART III closes with a summary of requirements for a sampling design for OMU. PART IV reports research findings that suggest a uniform optimum size for OMU samples. PART V outlines a recommended sampling strategy for guidance in data collection.

In summary, the report has been designed to provide action-oriented answers to major questions about both size of the samples to be drawn and the most promising strategy for planning and conducting the data-collection process.

II

REQUIREMENTS OF A SAMPLE

There are three basic characteristics which should be assured in any sample design. The first is that the sample be representative of the population from which it is drawn. Second, the sample must be obtained by some systematic probability process. Third, it should be as small as considerations of precision and dependability permit. These requirements seem simple enough at face value, but their implications are wide-reaching, and have resulted in a great deal of work by mathematicians, statisticians and researchers. As a background for subsequent discussions, definitions of these characteristics follow.

A. Representative. This means that the scope of the sample accurately reflects the diversity in the population. If we want to infer something about a population from a smaller sample of it, we must be sure that the sampled individuals illustrate the characteristics of that population. In more concrete terms, this means that OMU must be certain that all meaningful task behaviors in an OF are performed by some individuals in the sample. Another concern is the type of techniques to be used in analysis. The researcher must begin to specify at this point the minimal size of clusters he will accept as defining a job type, for this will affect the sample size (N) required.

B. Probability Process. Each individual in the population must have the opportunity to be included in the sample. That is, the sample should not automatically exclude any incumbent -- unless there is a special and sufficient

rationale for doing so. (An instance of automatic exclusion is discussed later in this report.)

C. Small as Precision Permits. The point here is partially economic and partially statistical. Economic reasons for a reduced sample are obvious. The statistical argument is somewhat more difficult, but it may be summarized as follows:

There are two basic types of error involved in estimating a population from a sample. One is called STANDARD ERROR and is directly related to sample size. The smaller the sample, the greater the Standard Error. Consequently, a sample size large enough to reduce Standard Error to an acceptable magnitude is needed. The second type of error is a NON-SAMPLING ERROR which falls into two classes. One is a random error that is essentially clerical in nature such as mismarking of answers, keypunch errors and failure to follow directions. These tend to cancel each other out. The other is a cumulative error whose source usually is some sort of bias in the data collection process. These sources of bias may be due to poorly-worded inventory statements or inadequate instructions, test fatigue, deliberate mis-answering, and other factors that introduce errors. These are generally non-random errors and do not cancel out; rather, theirs is a cumulative effect. Increasing the sample can in fact increase the error -- which is generally not recognized, either as to specific source or magnitude.

It may not seem that a sample could be too large. However, as the sample size increases, the probability of implying chance and spurious relationships or associations increases. Since statistical analysis involves

statements of probability based on estimates of population parameters, there is always the possibility of obtaining spurious relationships based on chance alone. For example, measurements of strength of association are usually accompanied by some "significance" level or statement of probability. Often this is arbitrarily chosen as a 0.05 level. This means that the findings obtained could have resulted from chance about five times in a hundred. Consequently, as sample size increases, the more likely it is that measures of implied relationships are exaggerated.[1]

The preceding requirements specify the basic characteristics of an optimum sample. It is useful to recognize what factors determine these characteristics for any particular study. The basic determinant of a sample is the purpose of the research. The Research Problem, when properly stated, dictates many of the requirements for the sample. The Statement of the Problem provides information on the exact nature and scope of the population of interest, the degree of generalizability required, the nature of the subclasses and strata, and at least latently, the economic constraints on the research.[2] These requirements and their relationships to sampling strategies and size are important considerations in selection of samples for Task Inventory Administration.

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[1] See Lazerwitz, Bernard, Sampling Theory and Procedures, in Blalock, H.M. and Blalock, Ann, eds., METHODOLOGY IN SOCIAL RESEARCH, New York: McGraw-Hill Book Co., 1968.

[2] See Technical Report No. 4, GUIDELINES FOR RESEARCH PLANNING & DESIGN IN TASK ANALYSIS. Los Angeles: California State University, Los Angeles, 1975.

III

SAMPLING STRATEGIES AND SAMPLE SIZE

A. Nature and Scope of the Population. When any research question is properly stated, it contains statements which, implicitly or explicitly, refer to the population of interest. These are usually "limiting" statements. For example, in OMU's TA studies, the interest is usually in a specific Occupational Field (OF) (population nature), but the problem does not deal with all characteristics of Marines themselves in that field. The interest is only in the tasks performed in a job or duty area of the OF. Thus, the scope of the population of interest is also stated. OMU's interest is on the roles performed by individuals, not the individuals in their own right. The assumption is that no matter who the individual is, his distinctive role will still be performed since the objective is to determine the actual structure of an OF and to find the most efficient means of staffing it (i.e., filling the roles required). Inasmuch as roles can only be filled by individuals, it is necessary to look at what individuals do in order to infer the structural aspects. As a consequence, the NATURE of the population is an Occupational Field, and the SCOPE is the occupational roles (task behaviors) performed in support of that field.

What this tells the researcher about sample size is that:

> Without respect to any other criteria, the population is composed of those roles performed by incumbents in any Occupational Field.

B. Subclasses and Strata. In any research activity it is necessary to define further the kinds of characteristics that are relevant to sampling. Once the general population is defined, it is necessary to determine what (if any) kinds of subclasses (groups), and strata (levels of roles) are relevant. In any Occupational Field, different roles (tasks) are performed by individuals of differing status (ranks). Further, it is likely that there are other criteria as well, such as level of the facility (echelon) where the tasks are performed. Since there is reason to believe that incumbents perform different roles (tasks) based on the subclass of the facility (echelon) and also by strata (status, rank), the sampling strategy must take these into consideration and adjust to them.

C. Generalizability. In the statement of the problem, it was noted that OMU's interest is in the tasks performed in a job or duty area of an OF and not in the Marine Corps as a whole. Because of this, it is not necessary to study every possible Marine to determine if he performs a role typical of all of the incumbents in the OF being studied, but only the tasks each individual OF incumbent performs. However, it is important to be able to generalize about the OF as a whole. It may be that roles are performed for which no formal sub-structure (i.e., MOS) currently exists; and, conversely, formal structures may exist for which no functional roles are performed. To infer the presence or absence of a formal sub-structure, i.e., to generalize to the OF structure as a whole, requires that all extant and potentially extant roles (not individuals) be inventoried.

D. Economic Constraints. Almost any research activity has certain

economic constraints. At OMU, these constraints are largely in the budget allocated for travel. Man-days are effectively "hidden" and do not represent real costs. The inhibiting effects of the travel budget make necessary some very real and basic policy decisions about sample size.

The largest cost-per-inventory travel item appears to be inclusion of overseas samples. The question is, can overseas travel be held to a minimum without violating the sampling essentials set forth by the preceding three requirements: nature and scope of the population; subclasses and strata; and generalizability? Obviously, some trade-off factors must be considered. The question to be asked is: "What is lost in precision by saving X number of dollars?" If the answer is that very little precision is lost, a policy can be made to exclude overseas sampling except in very special instances. A procedure for estimating this trade-off is outlined in a later section.

To summarize to this point, an optimum sampling design is one that is:

1. Representative of the population.
2. Drawn by a probability process.
3. As small as precision considerations permit.

The factors that determine these characteristics are:

1. The nature and scope of the population
   a. An Occupational Field.
   b. The tasks performed (roles).

2. The subclasses and strata

   a. Echelon of facility.

   b. Ranks (status).

3. Level of generalization required

   a. To the OF only.

   b. Including all sub-structures (formal and informal) which form the OF.

4. Economic constraints

   a. Travel costs.

IV

FINDINGS ON SAMPLE SIZE

Based upon the foregoing considerations it is of interest to determine if there is some way to arrive at an OPTIMUM SAMPLE SIZE that could be general enough to apply to the majority of OMU studies. To do this, several methods were considered.

It was hoped initially that one of the numerous statistical formulas for defining the required sample size (N) could be used. However, almost all of these formulas require some prior knowledge of the population parameters of the dependent variable, usually the mean ($M, \bar{x}$) or the standard deviation (σ, s). It became clear that Task Analysis has no dependent variable in the usual sense. That is, TA studies are not designed to predict or explain, for example, the varying functions of Y on X, but rather to describe and classify the roles performed by Marines in an OF into structural categories. As a consequence, it is necessary to determine if there is empirical evidence that can define a minimum sample size which, coupled with an appropriate strategy, can meet the criteria set forth in Section II of this report.

Stability Test. One of the methods chosen to determine mimimum sample size is called a Stability Test. Basically, this technique involves drawing successive pairs of random samples from some defined population and visually determining at what sample size the values of the variables begin

to stabilize. Usually, a pair of random selections for each size N is drawn and compared against another pair from a larger N. This process is repeated until the distribution of the values of the variable(s) stabilizes. Stabilization is the point at which a larger sample does not significantly change the distribution of the values of the variable. At this point samples of greater size become redundant, uninformative and uneconomical. This procedure is well described by Parten.[3]

Such an experiment was carried out with the data from OF 40. Matched pairs of random (with replacement) samples were drawn for 20 variables for N's of 30, 40, 50, 60, 70, 80, 90, 100, 150, 200, 250, 300, 320, 400, 500, and 700. Two kinds of variables were used. One was the task statement within each duty area that had the lowest percentage of zero ("I never do .....") responses. It follows that the variability in the score of 1 to 7 was greatest in that duty area. The second kind of variable chosen was one in which task statements had high percentages, 90, 92, 94, 96, 98 and 99% of responses equal to zero. Thus, between these two kinds of variables, the most to the least variability was represented. Tables 1 thru 20 in Appendix A present the results of these findings in full. It can be seen that somewhere between 300 and 400, the percentage-by-response category, along with the mean ($\bar{x}$) and variance (s^2), become stable for each variable, and that beyond 400, the gain in precision is minimal. The results of this experiment strongly suggest that a sample size of 400 has sufficiently

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[3]Parten, Mildred, SURVEYS, POLLS AND SAMPLES: PRACTICAL PROCEDURES, New York: Harper and Brothers, 1950.

high precision to be used as a general sample size for any OF study, provided that all cells in the sampling strategy can be filled by this N. (See Section V for the recommended Sampling Strategy. Contingencies for this are also accounted for in Section V.)

Similar stability tests were conducted for task inventory responses to TA studies of OF 41 and OF 43. Findings were similar to those in the OF 40 tests. Representative data are included in Appendix B and Appendix C.

One problem with the stability test is the question of its generalizability. It appears to be a unique phenomenon. In how many situations can it be applied? Can OMU depend upon our findings from the stability test to establish its criteria for sample size?

There is a statistical formula for determining sample size that is not directly tied to population parameters. It is simple and requires only one specification by the researcher. That is the confidence level with which he is concerned. Inasmuch as a 95% interval is most common in Behavioral Science research, it is used as an illustration. The formula for computing N is:

$$N = \frac{1}{K^2}$$

where K is the desired interval about the maximum proportion of variance in a sample. Thus, if we choose a 95% confidence interval, k = 1 - .95 = .05. Substituting in the formula:

$$n = \frac{1}{(.05)^2} = \frac{1}{.0025} = 400.$$

Interestingly, the N derived by the formula and that from the stability tests is the same. Both have a probability of 95%. The results of the two approaches -- one empirical and the other mathematical -- provide considerable support and justification for using N = 400 as a general rule. (A complete discussion of the derivation and proof of the formula described in the preceding paragraph is given by Lazerwitz).[4]

Further support for a sample size at or near 400 comes from studies by the Army Military Occupational Research Division that were designed to determine optimum sample size.[5] This research demonstrated that stability was achieved with a sample size of 384. Samples beyond this size provided such diminishing returns as to be considered uneconomical.

A different formula from that used in the Army studies, but based upon somewhat similar statistical methods, was recommended by an outside consultant.[6] Application of this formula yields an optimal sample size identical with that of the Army's research -- 384.

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[4]Lazerwitz, Bernard, Sampling Theory and Procedures, pp. 288 ff., in Blalock, H. M. and Blalock, Ann, eds., METHODOLOGY IN SOCIAL RESEARCH, New York: McGraw-Hill Book Co., 1968.

[5]Army Military Occupational Research Division, MODB USER'S MANUAL, Department of the Army, 1974.

[6]We are indebted to Dr. Robert Juola, Mathematics Department, Boise State University, for the assistance he provided by describing derivation and application of this formula. Details of the formula are given on pp. 41-43 of the Cal State LA ONR-USMC Research Technical Report No. 12.

It should be emphasized that an important requirement must be met if a decision is made to use a sample size of 400 based upon the above discussion of the three formulas and the stability tests. That requirement is that fully representative random sampling procedures must be used in sample selection.

If there remains doubt as to the efficacy of this number, OMU should draw a random sample of N = 400 using a random number generator (not odd-even social security numbers) and determine independently whether the clustering program produces the same job-types for the whole sample as for the sample of 400.

Based upon our findings and analysis, and subject to review and evaluation of future experience as suggested in the preceding paragraphs, we recommend a sample of 400 Marines from the OF in each TA study. In PART V following, we propose generalized guidelines for implementing a specific sampling strategy to be followed in data collection for each such study.

V

SAMPLING STRATEGY FOR OMU

The Sampling Strategy in this section has been designed to meet the criteria set forth in Section II and the optimum size demonstrated in Section IV. There will undoubtedly be occasions that call for modifications in this strategy. However, when these occur, such modifications should easily fit within the general design.

In Section II, under the heading of "probability process", it was stated that there should be no automatic exclusions from the sample. Also discussed in Section II was the concern for economic samples. How can these cross-purposes be resolved? It would reduce costs considerably to exclude all overseas incumbents from the sample. But, would this produce a less representative sample?

The experimental work required to provide an accurate answer to this question is costly in both machine time and man-hours. In order to determine if it might be worthwhile to engage in a formal analysis, it was decided to execute some simple tests on readily available data. The objective was to determine the degree of significant differences along various dimensions among incumbents billeted in the East Coast, West Coast, and Overseas. OMU provided print-outs of the three groups for OF 13 (Construction, Equipment, and Shore Party), along the dimensions of personal characteristics of Marines in the OF and the machinery and tools they operated. These dimensions were chosen, instead of discrete tasks, for two reasons. First, this was to be an

exploratory feasibility study rather than a formal analysis of the three clusters. Second, it was deemed desirable to see if the strata of the personnel would differ significantly, thus implying greater variability with respect to the intensity of task behavior. Ten items were selected from personnel characteristics and machinery operated categories. Table 1 presents a summary of these results.

Table 1

Tests for Significance among East, West, and Overseas Groups

Part A. t - tests

1. Pay grade

	EAST	WEST	OVERSEAS
$\bar{X}$	3.23	3.54	3.55
s	1.62	1.67	1.57
N	677	577	641

t_{ew} = 3.34 (sig = .001)

t_{eo} = 3.70 (sig = .001)

t_{ow} = .107 (N.S.)

2. How much OJT required before qualified for present duties?

	EAST	WEST	OVERSEAS
$\bar{X}$	3.42	3.66	3.83
s	3.08	3.32	3.35
N	660	571	635

t_{ew} = 1.42 (N.S.)

t_{eo} = 2.3 (Sig = .01)

t_{ow} = 0.87 (N.S.)

Table 1
(cont'd)

3. How well does your current job utilize your talents and training?

	EAST	WEST	OVERSEAS
$\bar{X}$	3.17	3.22	3.29
s	1.13	1.18	1.11
N	676	577	638

t_{ew} = .72 (N.S.)

t_{eo} = 1.88 (N.S.)

t_{ow} = 1.04 (N.S.)

4. How do you find your job:

	EAST	WEST	OVERSEAS
$\bar{X}$	2.58	2.61	2.65
s	1.01	0.991	0.9770
N	562	475	533

t_{ew} = .40 (N.S.)

t_{eo} = 1.63 (N.S.)

t_{ow} = .68 (N.S.)

Part B. Chi-Square Tests

1. Operate Mobile Engineering Equipment

A. 2 x 3 TABLE: $X^2 = 6.42$, sig $< .05$

B. 2 x 2 (W - E): $X^2 = 0.29$, N.S.

C. 2 x 2 (W - O): $X^2 = 3.3$, N.S.

D. 2 x 2 (E - O): $X^2 = 5.98$, sig $< .02$

2. Operate Forklift

A. 2 x 3 TABLE: $X^2 = 3.2$, N.S.

3. Operate Tractor

   A. 2 x 3 TABLE: $X^2 = 5.06$, sig .02

   B. 2 x 2 TABLE: (W - E) $X^2 = 4.57$, sig .04

   C. 2 x 2 TABLE: (W - O) $X^2 = 2.7$, N.S.

   D. 2 x 2 TABLE: (E - O) $X^2 = 0.22$ N.S.

4. Stud-Driver/Ramset Operator

   A. 2 x 3 TABLE: $X^2 = 1.2$, N.S.

5. Operate Outboard Motor

   A. 2 x 3 TABLE: $X^2 = 1.79$, N.S.

6. Use Minefield Marking Set

   A. 2 x 3 TABLE: $X^2 = 2.1$, N.S.

As can be seen from these data, there are few significant differences among the groups with respect to these selected variables. Significant differences appear as frequently between East and West Coast incumbents as in comparisons of either of these with Overseas incumbents. No claim is made that either the OF or the variables studied constitute a survey upon which to make a policy decision. However, given the potential cost-savings in terms of travel and TAD expenses, it is worthwhile to pursue the analysis further.

It is recommended, therefore, that the following methodology be employed by OMU to determine the potential risks and benefits to be derived from eliminating Overseas samples except in special cases. It may be that no data either from completed studies, or from those in process, can be used to determine this. Setting up the null hypothesis:

H_o: There is no significant difference among groups of Marines from the East Coast, West Coast, or Overseas with respect to:

a. the average number of tasks in the inventory performed.

b. the average "time spent" on any given task.

c. any job or duty performed by overseas incumbents and by CONUS incumbents (either on the East or West Coast).

Test of the first two parameters (a & b), requires a series of Analysis of Variance tests as evidence to support or reject the null hypothesis. The determination of the third parameter should be made through the CODAP clustering procedure. Each job classification found in the overseas sample should be found in one or the other (if not both) of the U.S. samples. (It is of no concern if a job group in U.S. samples does not occur in an overseas sample.)

In order to satisfy the hypothesis, at least four OF's should be used. Two of the OF's should be characterized by:

1. High technology.
2. High heterogeneity.

The other two should reflect:

1. Low technology - high heterogeneity.
2. Low technology - low heterogeneity.

If the null hypothesis is accepted for each of the four OF's then OMU should be highly confident about proceeding to exclude overseas billets from its sampling designs. On the other hand, if the null hypothesis is only accepted for some particular types of OF, it may be necessary to experiment further to see if there are categories of OFs in which major differences

occur in overseas tasks when compared with those performed in the CONUS. In any case, simple rejection of the null hypothesis for one or two types of OFs should not result in abandoning the concept altogether. Those familiar with statistical theory will recognize that this is a case of balancing Type I and Type II errors.[6] A simple contingency table can illustrate the potential results of this experiment:

Decision	H_o is actually TRUE	H_o is actually FALSE
Accept H_o	Gain cost savings from excluding overseas billets from sample	Type II error Lose precision in estimating the tasks in an OF, but save money
Reject H_o	Type I error Incur necessary expense for overseas sample	No gain No loss

In other words, if there is doubt about the degree to which the hypothesis is true, then OMU must balance the consequences of the course of action chosen on the basis of the above costs. It should be noted, however, that speaking statistically, the cells in the contingency table are not fixed. When a level for Type I (α error) is minimized), the probability of a Type II (β error) is increased, and vice-versa. For this reason, decisions based on rejecting the experimental null hypothesis should be made with caution.

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[6] For a discussion of Type I and Type II errors see: Blalock, H.M., SOCIAL STATISTICS, New York: McGraw-Hill Book Co., 1960, and Dixon, W.J., and Massey, F.J., Jr., INTRODUCTION TO STATISTICAL ANALYSIS, New York: McGraw-Hill Book Co., 1969.

Recommended Sampling Strategy. Whether results of an experiment are accepted or rejected, the strategy which follows is intended to serve as acceptable generalized guidelines for OMU. It will be recalled that Section III identified ranks (pay grades), facilities (echelons), and locations as being salient factors in obtaining a sound sample of an OF population. At this point the substructures (MOS's) are not relevant since these are part of what we are trying to determine. Further, it is assumed that by paying careful attention to the other three factors, all MOS's will be represented. (If we make MOS a predictor or determinant of MOS, there is little point in conducting the research.)

In order to satisfy the requirement of sampling as a probability process it is necessary that all cases are selected randomly. However, simple random sampling alone will not satisfy the requirements of strata, echelon and location. As a consequence, some form of STRATIFIED RANDOM SAMPLING is required so that we ensure that all ranks and echelons are represented. Location of Marine bases remains somewhat of a problem, since there are economic constraints that mitigate against sampling every unit which may have an OF incumbent represented.

Of major concern is the inclusion of all relevant strata (pay grades) in the sample. In the interests of accuracy and economy, it is recommended that pay-grade E-1 be eliminated from the sampling design. The rationale for this recommendation is that on the whole, E-1 incumbents are relatively new and unspecialized members of an OF. That is, their tasks tend to be generalized and are often relatively undefined. As a consequence, their

responses to the inventory can be said to be non-representative of a job area. They can be considered to be in an orientation phase during which they are learning as much about the Marine Corps in general as about their jobs. If this recommendation is adopted, there then remain a strata of 8 paygrades from which to draw a representative sample. This should provide an average of 50 incumbents per pay grade and a total sample of 400 for the OF.

It is important to emphasize that before the samples by strata can be selected, both location and echelon must be considered. Whether or not echelon is a factor must be determined during OMU's initial Study Phase. In Aircraft Maintenance, for example, it is clearly important. However, in other fields this may not be so. For the purposes of the design, let us assume that there are three clearly distinct levels (or echelons) of occupational activity in a mechanical OF. These can be designated as follows:

1. Level A - lowest degree of technology.
2. Level B - medium degree of technology.
3. Level C - highest degree of technology.

We assume that the kinds of tasks in each level are mutually exclusive. For example, Level A is concerned with routine preventive maintenance; Level B, with replacement and repair; and Level C, overhaul and full renovation. In this situation, we have need for at least 3 categories or sub-classes for sampling.

Level of echelon can then be used to determine location. For example,

Levels A and B may be co-resident at the same installation and Level C elsewhere. Consequently, location is in part determined by echelon. If there are alternative locations, then each location can be numbered 1...n, and the locations drawn from a table of random numbers.

The number of locations selected depends upon the number available and their geographic distribution. Assuming that overseas locations might be excluded, it may be that all echelons are equally represented at both East and West Coast facilities. If so, then no problem in selection exists since facilities in both geographic areas would normally be included. The reason for including both East and West Coast units is to minimize the chance of error inherent in geographical distribution of equipment and personnel. This is all the more important if overseas facilities are excluded from the sample.

Once the locations are determined, it becomes a simple matter of drawing a random sample from each of the eight pay grades. If both East and West Coast facilities are to be used, then 200 incumbents (25 for each pay grade) are sampled from each coast. The concentration from which these are drawn is not particularly important. What is of importance is that they represent the distribution of incumbents by rank at the locations chosen.

It should be possible to select the sample before arriving at a Marine Corps facility. If there are problems with this, then replacements can be drawn at the site.

A problem may arise in filling certain strata cells, particularly E-8's

and E-9's. However, these pay grades may be of great importance. It is recommended that MAIL INVENTORIES be used to obtain the 50 responses in each strata if this total of incumbents cannot be obtained in the CONUS. If only 30 E-9's can be found at the East and West Coast facilities, but another 30 can be found at overseas locations, inventories could be mailed to all 30 in overseas posts along with an appropriate letter of explanation to the Commanding Officers. The extra ten cases are to account for non-responses, loss in mail, damaged task inventory booklets, etc.

To summarize the recommended procedure:

1. Is echelon a subclass of concern?

   a. No. No action.
   b. Yes. Define levels and choose locations where appropriate.

2. East and West Coast Samples

   a. Two hundred incumbents to be sampled on each coast.
   b. Draw random samples of 25 per pay grade at the chosen installations on each coast.

The key objective in this strategy is to insure that Marines shall be drawn randomly within subclass and strata. Only if this requirement is satisfied can generalizations be made to the OF as a whole. By random, we do not mean simple selection by social security number, but through the use of computerized random number generators. If these strategies are followed, the characteristics of the sample will meet the general requirements of a sample as set forth in Section II:

1. Representative of the population.
2. Selected by a probability process.
3. As small as precision permits.
4. As economical as possible.

BIBLIOGRAPHY

Blalock, Hubert M., SOCIAL STATISTICS. New York: McGraw-Hill Book Co., 1960

An excellent introductory text to basic statistics. This book covers both parametric and non-parametric statistics from descriptive design through correlation, multiple regression, analysis of variance and covariance, the factor model and sampling. Previous mathematical knowledge is helpful but not required as the text is presented in intuitive fashion. Highly recommended as an introduction to (social science) statistical analysis.

Dixon, W.J., and Massey, F.J., Jr., INTRODUCTION TO STATISTICAL ANALYSIS. New York: McGraw-Hill Book Co., 1969.

While covering the same material (except factor analysis) as Blalock, this introductory statistical textbook is far more demanding on the student. Elaborate mathematical proofs are presented; most data examples are lacking behavioral (social) science referents. In essence this makes a good reference text for the experienced analyst, but not the beginner. The senior author has also written and edited a computer package for analysis. Known as the UCLA B.M.D. (Bio-medical Package) its routines, while efficient, are hardly understandable to the inexperienced researcher. Dixon's publications in general are not recommended for the novice.

Hays, William L., STATISTICS. New York: Holt, Rinehart and Winston, 1963.

As with Dixon and Massey, the Hays book is unnecessarily complicated. Its tables are somewhat more complete (the normal table is carried to six places). Unlike Dixon and Massey, Hays does provide more textual explanation of his derivations and, as a psychologist, his examples fall more clearly into the cognitive patterns of behavioral scientists who, by and large, lack adequate mathematical training.

Lazerwitz, Bernard, Sampling Theory and Procedures, in Blalock, H.M. and Blalock, Ann, eds., METHODOLOGY IN SOCIAL RESEARCH. New York: McGraw-Hill Book Co., 1968.

An excellent and basic article on sampling which combines the rigors of statistical requirements with the problems of the behavioral researcher. Pragmatic.

Parten, Mildred, SURVEYS, POLLS, AND SAMPLES: PRACTICAL PROCEDURES, New York: Harper and Brothers, 1950.

Although published in 1950, this book is still a classic on principles and procedures of sampling. It gives systematic, step-by-step descriptions of procedures necessary for carrying out investigations based upon

samples of larger populations. Methods discussed include personal and telephone interviews, mail questionnaires, and observational methods. Examples range from consumer and market surveys, to public opinion polls, surveys of the census type, radio audience surveys, and social surveys. It is the most complete work of its kind on the advantages and disadvantages of different types of sampling procedures. The "stability test" used in some of the studies of OF Sample Size in our ONR-USMC research is described on pp. 320-326. However, there is much more that is of value to those seriously concerned with sampling principles, problems and methodologies.

Van de Geer, John P., INTRODUCTION TO MULTIVARIATE ANALYSIS FOR THE SOCIAL SCIENCES, San Francisco: W.H. Freeman and Company, 1971.

This is an excellent introductory text to the subjects of multivariate analysis. Beginning with a review of matrix algebra, the author proceeds through regression analysis through factor and canonical analysis, non-recursive models and discriminant analysis. The book is written clearly for those with a background in matrix algebra. Those without such background can, with effort, gain great insights into the nature of multivariate relationships.

APPENDIX A

COMPLETE DATA FROM STABILITY TESTS CONDUCTED IN ANALYSIS OF RESPONSES TO OCCUPATIONAL FIELD (OF) 40 TASK ANALYSIS INVENTORY

TABLE 1

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question A0001

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	36.7	30.0	55.3	59.5	35.1	43.4	53.3	36.8	40.7	48.2	47.4	35.1
1	56.7	32.1	26.3	23.8	51.4	47.2	40.0	42.1	38.9	40.0	35.8	51.9
2	---	7.1	7.9	4.8	2.7	---	1.7	10.5	7.4	3.5	6.3	2.6
3	6.7	---	---	---	8.1	1.9	1.7	1.8	---	2.4	1.1	2.6
4	---	7.1	7.9	7.1	---	7.5	3.3	3.5	7.4	3.5	7.4	6.5
5	---	3.6	2.6	4.8	---	---	---	---	5.6	---	---	1.3
6	---	---	---	---	---	---	---	---	---	2.4	---	---
7	---	---	---	---	2.7	---	---	5.3	---	---	2.1	---
$\bar{x}$	.76	.92	.87	.86	1.1	.83	.62	1.2	1.1	.82	.96	.97
S^2	.59	1.85	1.8	2.1	2.1	1.2	.78	2.8	2.0	1.5	2.1	1.3

	N=90		N=100		N=150		N=200		N-230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	38.5	41.1	47.5	35.7	40.6	42.9	38.8	39.3	39.2	38.5	43.2	40.7
1	40.7	45.5	41.6	47.3	42.4	42.9	46.7	43.6	42.2	41.7	40.5	40.7
2	7.7	2.0	5.0	4.5	6.1	3.0	5.6	4.3	4.2	5.7	3.9	5.3
3	2.2	1.0	---	2.7	3.0	1.5	.5	1.4	2.5	3.2	1.5	2.0
4	8.8	9.1	4.0	7.1	6.1	6.8	5.6	8.1	7.6	6.9	8.1	8.9
5	1.1	1.0	1.0	---	1.2	1.5	.9	1.4	1.3	1.6	.4	.8
6	---	---	---	.9	---	.8	---	---	.8	.8	---	.4
7	1.1	---	1.0	1.8	.6	.8	1.9	1.9	2.1	1.6	2.3	1.2
$\bar{x}$	1.1	.93	.79	1.1	.98	.97	1.0	1.1	1.15	1.1	1.0	1.1
S^2	1.9	1.5	1.4	2.0	1.5	1.8	1.8	2.1	2.4	2.2	2.2	2.0

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	38.9	**	41.5	43.7	41.5	42.1	40.6	39.1	42.6	42.2
1	46.1		41.8	40.1	45.1	41.1	43.0	44.8	40.9	42.9
2	3.9		5.1	4.2	3.6	4.6	4.5	4.8	4.4	3.8
3	2.1		1.8	1.6	1.7	1.7	1.7	2.0	2.4	2.5
4	7.5		7.8	7.8	6.1	7.5	7.9	7.1	7.2	6.1
5	.7		1.8	1.0	.7	1.7	.8	1.0	1.0	1.0
6	.4		---	.3	.2	.2	.2	.2	.3	.4
7	.4		.3	1.3	1.0	1.0	1.3	1.0	1.2	1.0
$\bar{x}$	1.0		.99	1.0	.93	1.0	1.0	1.0	1.0	.9
S^2	1.5		1.6	1.0	1.6	1.9	1.8	1.7	1.8	1.7

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question A 001 on which the total population response to "0", "Do Not Perform Task" was 46%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 2

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question M005

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	50.0	75.0	55.3	57.1	59.5	60.4	71.7	56.1	61.1	61.2	65.3	59.7
1	3.3	---	2.6	4.8	---	7.5	1.7	8.8	3.7	1.2	4.2	6.5
2	13.3	---	2.6	4.8	5.4	5.7	3.3	5.3	5.6	2.4	2.1	5.2
3	6.7	---	2.6	---	5.4	1.9	1.7	1.8	7.4	2.4	---	---
4	13.3	17.9	10.5	14.3	13.5	9.4	11.7	8.8	---	14.1	8.4	13.0
5	---	3.6	5.3	4.8	10.8	1.9	3.3	1.8	7.4	3.5	4.2	2.6
6	13.3	---	7.9	2.4	2.7	1.9	3.3	8.8	5.6	8.2	6.3	6.5
7	---	3.6	13.2	11.9	2.7	11.3	3.3	8.8	9.3	7.1	9.5	6.5
$\bar{x}$	1.8	1.1	2.2	1.9	1.7	1.6	1.2	1.8	1.8	1.8	1.7	1.6
S2	4.9	4.4	7.9	6.9	5.1	6.2	4.5	3.5	6.7	6.5	6.7	5.8

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	71.4	63.6	62.4	61.6	61.2	64.7	63.6	58.3	54.9	53.8	61.8	65.0
1	2.2	4.0	4.0	2.7	4.8	2.3	2.3	2.8	4.6	5.3	1.9	3.3
2	3.3	4.0	6.9	2.7	4.2	3.0	2.8	4.3	4.2	3.2	4.6	2.8
3	2.2	---	3.0	3.6	2.4	1.5	2.8	1.4	3.0	2.4	1.9	1.2
4	7.7	6.1	9.9	11.6	11.5	12.0	10.7	10.4	10.1	11.3	8.1	11.8
5	4.4	3.0	5.0	4.5	2.4	3.8	3.7	4.3	5.1	5.3	2.7	2.8
6	4.4	8.1	5.9	5.4	6.1	3.8	4.7	5.7	4.2	6.5	8.1	4.5
7	4.4	11.1	3.0	8.0	7.3	9.0	9.3	12.8	13.9	12.1	10.8	8.5
$\bar{x}$	1.2	1.8	1.5	1.8	1.6	1.7	1.7	2.0	2.1	2.2	1.9	1.6
S2	4.9	7.2	4.9	6.3	5.9	6.2	6.4	7.3	7.3	7.2	7.1	6.1

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	61.1	**	61.2	61.2	60.0	61.3	60.5	60.9	61.0	62.3
1	4.3		3.0	2.3	3.4	4.4	3.4	4.2	3.5	4.4
2	3.2		3.9	3.6	4.1	3.9	3.6	3.6	3.2	3.2
3	2.9		2.4	2.6	2.4	2.9	2.3	1.6	2.8	2.0
4	10.4		9.3	8.7	10.0	9.0	10.2	10.5	10.4	9.9
5	5.0		5.7	3.2	4.4	3.4	4.7	3.4	4.4	3.9
6	5.4		5.7	6.5	4.9	6.6	5.6	5.0	5.3	5.1
7	7.9		9.0	12.0	10.9	8.5	9.8	10.7	9.4	9.1
$\bar{x}$	1.7		1.8	1.9	1.8	1.7	1.8	1.8	1.8	1.7
S2	6.1		6.5	7.2	6.7	6.3	6.6	6.7	6.5	6.3

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question M005 on which the total population response to "0", "Do Not Perform Task" was 62% . Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 3

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question F005

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	66.7	60.7	63.2	71.4	54.1	67.9	66.7	63.2	53.7	62.4	53.7	67.5
1	3.3	---	5.3	---	2.7	7.5	1.7	5.3	7.4	4.7	3.2	6.5
2	10.0	3.6	2.6	2.4	2.7	3.8	5.0	3.5	11.1	2.4	4.2	---
3	10.0	3.6	5.3	---	2.7	---	1.7	3.5	1.9	1.2	4.2	2.6
4	3.3	7.1	---	9.5	16.2	5.7	8.3	8.8	11.1	12.9	14.7	5.2
5	---	10.7	---	4.8	8.1	1.9	5.0	3.5	1.9	5.9	4.2	2.6
6	6.7	7.1	5.3	7.1	18.1	7.5	6.7	1.8	3.7	3.5	5.3	9.1
7	---	7.1	18.4	4.8	5.4	5.7	5.0	10.5	9.3	7.1	10.5	6.5
$\bar{X}$	1.1	1.9	1.9	1.4	2.1	1.3	1.5	1.6	1.8	1.6	2.1	1.5
S2	3.2	6.8	8.2	5.8	6.4	5.4	5.6	6.1	5.8	5.9	6.7	6.1

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	67.0	58.6	74.3	61.6	61.8	59.4	59.8	58.8	68.4	61.1	61.4	57.7
1	3.3	4.0	2.0	8.0	4.2	5.3	5.6	7.1	5.5	8.5	5.4	6.9
2	2.2	3.0	4.0	2.7	2.4	5.3	3.7	1.9	3.4	3.6	4.2	3.7
3	1.1	3.3	1.0	5.4	1.8	3.8	1.4	4.3	1.3	3.6	2.3	1.6
4	16.5	16.2	8.9	8.9	10.9	11.3	10.7	11.4	7.2	8.9	8.5	14.2
5	1.1	6.1	4.0	3.6	4.2	6.8	4.7	3.8	3.8	4.1	3.9	3.3
6	3.3	2.0	3.0	2.7	4.2	1.5	4.7	3.8	4.6	2.4	6.9	4.1
7	5.5	7.1	3.0	7.1	10.3	6.8	9.3	9.0	6.8	7.7	7.3	8.5
$\bar{X}$	1.4	1.8	1.1	1.5	1.8	1.6	1.8	1.7	1.3	1.5	1.7	1.8
S2	5.1	5.7	4.1	5.3	6.6	5.4	6.4	6.1	5.4	5.4	6.1	6.0

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	59.6	**	58.2	62.5	61.9	64.0	62.8	60.9	63.2	62.9
1	2.9		6.6	4.2	5.1	5.1	5.1	5.2	4.7	4.5
2	4.6		3.9	3.9	3.4	4.9	3.9	3.8	3.6	3.8
3	2.9		2.7	2.9	3.2	2.4	3.0	3.6	2.8	2.6
4	10.7		10.7	9.4	10.2	10.0	9.2	8.3	9.8	9.3
5	4.3		4.8	4.5	4.1	3.9	4.1	4.4	3.7	4.1
6	5.7		4.5	3.9	2.9	2.4	3.8	4.6	4.7	4.7
7	9.3		8.7	8.7	9.2	7.3	8.1	9.1	7.4	8.0
$\bar{X}$	1.8		1.8	1.6	1.6	1.5	1.6	1.7	1.6	1.6
S2	6.5		6.1	6.1	6.0	5.3	5.8	6.2	5.7	5.9

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question F005 on which the total population response to "0", "Do Not Perform Task" was 64%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 4

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question B019

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	66.7	67.9	65.8	66.7	51.4	67.9	58.3	56.1	63.0	61.2	60.0	70.1
1	16.7	14.3	10.5	14.3	16.2	11.3	15.0	12.3	13.0	23.5	12.6	13.0
2	3.3	---	5.3	2.4	2.7	1.9	5.0	10.5	3.7	---	9.5	3.9
3	---	---	---	7.1	---	1.9	3.3	1.8	1.9	1.2	2.1	---
4	13.3	14.3	5.3	4.8	18.9	13.2	11.7	12.3	9.3	11.8	13.7	6.5
5	---	---	2.6	---	2.7	---	3.3	1.8	1.9	1.2	---	---
6	---	---	---	2.4	5.4	---	1.7	---	1.9	1.2	2.1	3.9
7	---	3.6	10.5	2.4	2.7	3.8	1.7	5.3	5.6	---	---	2.6
$\bar{x}$	.76	.96	1.3	.91	1.6	1.0	1.2	1.3	1.2	.87	1.1	.88
S^2	1.9	3.4	5.4	2.9	4.7	3.4	3.4	3.9	4.4	2.2	2.6	3.3

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	63.7	53.5	63.4	60.7	64.2	59.4	57.5	60.7	66.2	60.3	60.2	62.2
1	13.2	20.2	13.9	16.1	12.1	15.8	16.4	15.6	13.9	15.0	15.4	14.6
2	3.3	4.0	1.0	3.6	6.1	3.0	5.6	5.6	3.0	4.5	3.9	2.8
3	4.4	5.1	3.0	1.8	1.2	1.5	3.3	3.8	2.1	1.6	3.9	4.5
4	11.0	14.1	12.9	11.6	8.5	15.8	10.7	8.1	9.7	11.3	9.3	10.2
5	---	---	2.0	1.8	2.4	.8	2.8	1.9	1.9	2.0	2.3	2.4
6	2.2	2.0	2.0	.9	1.8	.8	1.4	1.9	1.3	2.4	2.3	.4
7	2.2	1.0	2.0	3.6	3.6	3.0	2.3	2.4	2.1	2.8	2.7	2.8
$\bar{x}$	1.1	1.2	1.1	1.1	1.1	1.2	1.2	1.1	.96	1.2	1.2	1.1
S^2	3.2	2.9	3.5	3.6	3.7	3.5	3.3	3.2	3.0	3.7	3.6	3.3

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	54.6	**	60.0	64.4	60.0	61.3	60.3	60.9	62.4	60.6
1	17.9		15.8	11.7	13.1	14.8	14.3	5.1	14.3	14.9
2	6.8		5.7	5.2	5.6	5.4	3.9	3.8	4.2	4.4
3	4.6		2.7	1.9	2.7	2.7	2.3	3.2	2.4	3.1
4	9.6		10.1	10.0	11.9	9.2	11.7	10.1	10.3	10.4
5	2.5		1.8	2.3	1.5	1.2	2.3	2.2	1.8	2.0
6	1.8		1.2	2.3	1.7	2.7	2.1	1.8	2.1	2.0
7	2.1		2.7	2.3	3.6	2.7	3.2	2.8	2.6	2.6
$\bar{x}$	1.2		1.1	1.1	1.2	1.1	1.2	1.1	1.1	1.1
S^2	3.3		3.2	3.4	3.7	3.4	3.7	3.5	3.4	3.5

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question B019 on which the total population response to "0", "Do Not Perform Task" was 64%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 5

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question N003

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	60.0	67.9	81.6	71.4	75.7	69.8	78.3	82.5	72.2	65.9	71.6	75.3
1	3.3	---	2.6	2.4	---	3.8	1.7	3.5	3.7	5.9	4.2	2.6
2	10.0	7.1	3.5	---	2.7	3.8	---	1.8	---	2.4	3.2	2.6
3	---	7.1	2.6	---	---	3.8	---	---	1.9	2.4	---	2.6
4	20.0	10.7	5.3	4.8	16.2	11.3	8.3	7.0	7.4	11.8	10.5	14.3
5	3.3	3.6	---	4.8	---	1.9	3.3	1.8	1.9	3.5	2.1	---
6	---	---	---	7.1	---	1.9	---	---	5.6	3.5	6.3	---
7	3.3	3.6	2.6	9.5	5.4	3.8	8.3	3.5	7.4	4.7	2.1	2.6
$\bar{x}$	1.4	1.2	.6	1.5	1.1	1.2	1.1	.68	1.3	1.4	1.1	.90
S^2	4.2	3.9	2.3	6.9	4.3	4.1	5.1	2.9	5.8	4.9	4.4	3.1

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	70.3	66.7	74.3	66.1	66.7	73.7	68.2	68.7	66.7	70.0	68.0	72.8
1	1.1	3.0	3.0	5.4	1.8	3.0	1.4	3.3	3.8	3.6	3.5	2.8
2	2.2	6.1	4.0	3.6	3.6	4.5	4.2	3.3	4.2	3.2	3.1	2.0
3	1.1	4.0	1.0	.9	1.8	1.5	2.3	2.4	2.1	3.6	1.9	1.2
4	14.3	11.1	10.9	14.3	11.5	11.3	11.2	10.4	11.8	9.7	12.7	12.6
5	1.1	2.0	2.0	.9	4.2	---	1.4	2.4	1.3	2.8	1.9	2.0
6	---	2.0	1.0	4.5	3.0	3.8	3.3	4.3	3.4	2.8	2.7	2.4
7	9.9	5.1	4.0	4.5	7.3	2.3	7.9	5.2	6.8	4.0	6.2	4.1
$\bar{x}$	1.4	1.3	1.0	1.3	1.5	1.0	1.4	1.3	1.4	1.2	1.4	1.1
S^2	5.7	4.5	3.8	4.8	5.6	3.6	5.6	4.9	5.2	4.4	5.0	4.3

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	66.1	**	71.0	69.6	73.1	71.5	70.5	70.4	69.8	70.7
1	5.4		3.3	2.9	2.9	2.7	3.2	3.4	3.1	3.2
2	4.3		4.5	3.6	2.4	2.7	3.9	2.6	3.5	3.5
3	2.9		2.7	1.9	1.5	1.2	2.4	2.0	1.7	2.2
4	10.7		7.2	10.7	10.4	11.7	9.8	9.7	11.2	10.8
5	1.8		3.0	1.6	2.4	1.9	2.1	2.6	1.9	2.2
6	4.3		3.0	4.9	2.9	3.6	3.4	3.2	3.2	2.6
7	4.6		5.4	4.9	4.4	4.6	4.7	6.0	5.7	4.8
$\bar{x}$	1.3		1.2	1.3	1.1	1.2	1.2	1.3	1.3	1.2
S^2	4.7		4.6	4.9	4.4	4.7	4.5	5.0	4.8	4.5

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question N003 on which the total population response to "0", "Do Not Perform Task" was 66%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 6

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question 0 001

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	76.5	80.0	66.7	68.2	80.4	69.4	69.8	70.8	73.4	70.7	72.6	67.7
1	---	---	2.4	2.3	3.9	2.0	---	6.3	2.5	3.7	2.7	2.2
2	---	3.3	4.8	---	3.9	2.0	2.3	2.1	5.1	---	5.5	3.2
3	---	---	2.4	4.5	2.0	2.0	4.7	---	1.3	6.1	4.1	3.2
4	5.9	6.7	14.3	6.8	7.8	14.3	7.0	12.5	7.6	12.2	5.1	8.6
5	---	6.7	---	4.5	---	---	9.3	---	3.8	2.4	1.4	4.3
6	5.9	---	9.5	6.8	---	6.1	---	4.2	2.5	1.2	2.7	6.5
7	11.8	3.3	---	6.8	2.0	4.1	7.0	4.2	3.8	3.7	5.5	4.3
$\bar{x}$	1.4	.90	1.3	1.5	.62	1.3	1.4	1.1	1.1	1.2	1.1	1.4
S^2	7.2	3.8	4.4	6.2	2.2	5.1	5.4	4.4	4.2	4.1	4.4	5.3

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	73.5	67.1	67.0	76.4	75.5	68.8	72.3	71.8	71.4	74.5	68.6	74.5
1	4.1	1.2	5.7	3.4	1.3	2.6	2.6	1.4	2.4	1.7	3.6	2.7
2	4.1	6.1	2.8	---	3.3	3.2	2.1	2.4	1.6	2.6	1.8	2.3
3	1.0	2.4	2.8	2.2	4.0	4.5	4.1	3.3	4.9	3.0	4.0	1.9
4	13.3	12.2	11.3	7.9	4.0	11.7	12.3	10.5	10.6	8.9	11.7	7.3
5	---	2.4	.9	2.2	1.3	1.9	2.1	2.4	3.3	1.7	1.8	4.2
6	2.0	3.7	3.8	3.4	5.3	1.9	.5	4.3	2.4	2.6	2.7	3.1
7	2.0	4.9	5.7	4.5	5.3	5.2	4.1	3.8	3.3	5.1	5.8	3.9
$\bar{x}$	.95	1.4	1.3	1.0	1.1	1.3	1.1	1.0	1.1	1.1	1.3	1.1
S^2	3.3	4.9	4.9	4.4	4.8	4.6	4.0	4.6	4.2	4.5	4.9	4.4

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	73.7	71.7	69.4	74.5	71.8	73.7	74.6	72.1	73.8	72.2
1	3.1	2.6	1.8	2.2	1.8	2.2	2.8	1.8	1.8	2.4
2	2.7	3.6	2.7	2.2	3.1	2.4	2.8	2.2	3.1	2.2
3	3.1	4.6	3.3	2.2	4.1	3.2	3.2	3.2	3.4	3.4
4	9.6	7.5	11.5	9.9	8.7	8.8	7.2	10.2	9.0	10.5
5	1.7	2.6	3.3	2.2	3.1	1.9	2.1	2.4	2.4	2.2
6	2.8	3.3	3.6	3.2	3.8	4.4	3.2	2.8	2.2	2.8
7	3.8	4.2	4.2	3.5	3.8	3.4	4.1	5.4	4.4	4.3
$\bar{x}$	1.0	1.2	1.3	1.1	1.2	1.1	1.0	1.2	1.1	1.2
S^2	3.9	4.3	4.7	4.2	4.5	4.3	4.2	4.8	4.2	4.4

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question 0 001 on which the total population response to "0", "Do Not Perform Task" was 71%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 7

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question G027

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	73.3	82.1	68.4	73.8	59.5	66.0	78.3	70.2	72.2	69.4	60.0	70.1
1	---	---	2.6	---	5.4	1.9	---	---	1.9	2.0	1.1	3.9
2	6.7	---	2.6	---	2.7	3.8	1.7	5.3	3.7	4.7	3.2	3.9
3	3.3	3.6	---	---	5.4	1.9	1.7	---	---	3.5	3.2	2.6
4	10.0	3.6	5.3	9.5	10.8	9.4	10.0	14.0	13.0	9.4	17.9	7.8
5	---	---	5.3	2.4	---	3.8	1.7	1.8	---	2.4	3.2	2.6
6	---	3.6	2.6	2.4	2.7	5.7	1.7	3.5	1.9	2.4	3.2	3.9
7	6.7	7.1	13.2	11.9	13.5	7.5	5.0	5.3	7.4	5.9	8.4	5.2
$\bar{x}$	1.1	.96	1.6	1.5	1.8	1.6	1.0	1.3	1.2	1.2	1.8	1.2
S^2	4.4	4.9	7.2	6.8	6.9	6.1	4.3	5.0	5.1	4.8	6.1	4.8

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	65.9	74.7	65.3	68.8	69.1	67.7	64.5	66.8	65.4	67.2	71.4	68.3
1	1.1	1.0	---	5.4	.6	2.3	2.3	2.4	2.5	2.4	2.7	2.4
2	4.4	1.0	4.0	1.8	---	3.0	3.3	2.4	3.8	2.8	1.2	2.4
3	3.3	2.0	5.0	1.8	3.6	3.0	3.7	1.9	2.1	1.6	3.1	1.6
4	8.8	4.0	14.9	9.8	10.9	15.0	12.1	10.4	11.0	9.7	10.0	12.6
5	2.2	3.0	1.0	1.8	2.4	1.5	.5	2.4	1.7	1.6	1.9	1.6
6	2.2	4.0	2.0	3.6	3.6	.8	4.7	3.8	3.0	4.9	1.5	1.6
7	12.1	10.1	7.9	7.1	9.7	6.8	8.9	10.0	10.5	9.7	8.1	9.3
$\bar{x}$	1.6	1.4	1.5	1.3	1.6	1.4	1.6	1.6	1.6	1.6	1.3	1.5
S^2	6.5	6.3	5.5	5.3	6.3	4.9	6.0	6.3	6.2	6.3	5.3	5.8

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	68.9	**	69.6	72.8	69.7	66.4	68.4	68.5	66.9	69.1
1	1.8		.9	1.3	1.7	1.2	2.3	1.6	1.7	1.8
2	3.2		2.7	2.3	2.9	2.4	2.6	2.4	2.9	3.1
3	1.4		2.4	1.9	1.0	2.2	1.9	2.6	2.4	1.9
4	8.9		10.7	9.1	10.7	10.9	10.3	9.1	11.8	10.2
5	2.5		1.2	.6	2.2	2.4	1.7	3.2	1.7	2.0
6	4.6		4.5	3.6	3.9	3.2	3.8	2.8	3.5	3.2
7	8.6		8.1	8.4	8.0	11.2	9.0	9.7	9.3	8.8
$\bar{x}$	1.5		1.5	1.3	1.4	1.6	1.5	1.5	1.6	1.4
S^2	6.0		5.8	5.6	5.7	6.5	5.9	6.1	6.0	5.8

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question G027 on which the total population response to "0", "Do Not Perform Task" was 71%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 8

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question B009

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	76.7	71.4	86.8	73.8	86.5	81.1	80.0	71.9	68.5	76.5	73.7	75.3
1	6.7	7.1	2.6	7.1	---	5.7	1.7	8.8	14.8	9.4	11.6	9.1
2	3.3	3.6	2.6	---	---	1.9	3.3	1.8	1.9	1.2	1.1	2.6
3	---	3.6	---	4.8	---	3.8	1.7	5.3	3.7	1.2	3.2	---
4	10.0	7.1	5.3	11.9	8.1	---	10.0	3.5	---	7.1	6.3	7.8
5	---	---	---	---	---	1.9	1.7	1.8	---	1.2	---	1.3
6	---	3.6	---	---	---	3.8	1.7	3.5	3.7	2.4	1.1	1.3
7	3.3	3.6	2.6	2.4	5.4	1.9	---	3.5	7.4	1.2	3.2	2.6
$\bar{x}$	.77	1.0	.47	.86	.70	.70	.72	.97	1.0	.72	.77	.78
S^2	2.9	3.8	2.1	2.9	3.5	3.1	2.4	3.8	4.5	2.6	2.8	2.9

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	74.7	73.7	78.2	81.3	76.4	79.7	72.4	75.8	77.6	77.7	76.1	72.4
1	2.2	10.1	8.9	5.4	9.7	8.3	11.7	7.1	8.9	6.1	7.7	9.3
2	2.2	5.1	3.0	3.6	1.8	3.0	3.3	2.8	3.0	3.6	2.3	5.3
3	2.2	2.0	---	2.7	1.8	---	1.9	4.3	3.0	1.6	2.7	.8
4	13.2	5.1	6.9	2.7	6.7	5.3	6.5	6.2	4.2	5.7	5.4	6.5
5	---	1.0	---	.9	---	.8	---	.5	.8	1.2	.4	1.6
6	2.2	---	1.0	---	1.2	1.5	1.4	---	.8	1.2	1.9	.8
7	3.3	3.0	2.0	3.6	2.4	1.5	2.8	3.3	1.7	2.8	3.5	3.3
$\bar{x}$	1.0	.73	.62	.61	.69	.59	.78	.76	.62	.74	.80	.84
S^2	3.8	2.5	2.3	2.5	2.5	2.2	2.7	2.7	2.1	2.8	3.2	3.0

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	75.0	**	74.9	76.7	75.2	76.6	74.1	74.4	75.2	74.3
1	9.6		8.4	6.1	9.5	7.8	9.0	9.7	9.0	9.5
2	3.8		3.6	4.5	3.4	2.9	3.2	2.6	2.8	2.9
3	2.5		2.4	.6	1.2	2.4	2.1	2.4	1.5	1.8
4	6.4		5.1	6.8	6.3	5.6	7.0	6.5	7.4	7.2
5	1.1		1.2	1.3	1.0	1.0	.6	.8	.8	.7
6	.4		1.2	1.6	1.0	1.2	1.7	1.6	1.2	1.2
7	1.4		3.3	2.3	2.4	2.4	2.4	2.0	2.1	2.5
$\bar{x}$	.68		.79	.7	.7	.7	.8	.7	.75	.7
S^2	2.1		2.9	2.8	2.6	2.6	2.8	2.6	2.6	2.7

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question B009 on which the total population response to "0", "Do Not Perform Task" was 76%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 9

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question E017

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	86.7	82.1	71.1	83.3	67.6	77.4	68.3	77.2	74.1	78.8	71.6	79.2
1	---	3.6	2.6	2.4	10.8	3.8	3.3	3.5	5.6	2.4	5.3	1.3
2	---	---	2.6	---	---	3.8	3.3	3.5	5.6	2.4	7.4	2.6
3	---	---	2.6	---	5.4	---	---	1.8	---	2.4	---	2.6
4	10.0	3.6	5.3	4.8	8.1	9.4	10.0	3.5	7.4	7.1	10.5	7.8
5	---	3.6	2.6	4.8	---	1.9	8.3	3.5	1.9	3.5	2.1	5.2
6	3.3	3.6	2.6	2.4	5.4	1.9	1.7	1.8	---	1.2	2.1	---
7	---	3.6	10.5	2.4	2.7	1.9	5.0	5.3	5.6	2.4	1.1	1.3
$\bar{x}$	.6	.82	1.4	.76	1.1	.83	1.4	.95	.94	.84	.93	.80
S^2	2.5	4.0	6.2	3.5	4.0	3.1	5.1	4.2	3.8	3.3	3.0	2.9

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	83.5	78.8	84.2	75.9	77.0	73.7	78.0	73.9	80.6	75.7	79.2	75.6
1	4.4	5.1	4.0	5.4	3.0	7.5	5.6	6.6	4.6	4.5	4.6	4.1
2	2.2	2.0	1.1	2.7	1.8	3.0	2.3	1.4	2.1	2.0	2.3	2.4
3	1.1	3.0	1.1	---	1.8	---	1.9	1.4	1.7	1.6	1.5	3.3
4	2.2	7.1	3.0	8.0	7.3	11.3	5.6	10.0	5.9	8.1	6.6	8.5
5	2.2	2.0	2.0	3.6	4.8	1.5	1.9	2.4	1.3	3.2	1.5	3.3
6	2.2	1.0	2.0	---	.6	---	1.4	.9	1.3	2.0	2.3	1.6
7	2.2	1.0	3.0	4.5	3.6	3.0	3.3	3.3	2.5	2.8	1.9	1.2
$\bar{x}$	.60	.7	.63	.9	.95	.87	.8	.9	.7	.94	.75	.87
S^2	2.7	2.4	2.9	3.7	3.8	3.1	3.2	3.5	2.7	3.6	2.9	3.0

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	76.8	**	71.6	75.1	75.5	79.3	77.4	75.4	78.4	76.1
1	3.6		4.8	3.9	4.9	4.4	5.5	5.8	4.3	5.8
2	2.1		3.3	1.6	2.2	1.7	2.3	1.6	1.9	2.0
3	1.4		1.2	1.9	1.7	2.4	1.3	1.8	1.7	1.9
4	7.1		8.7	9.1	8.3	7.1	6.4	7.3	7.1	6.9
5	3.2		4.2	2.6	3.2	1.9	2.6	3.2	2.8	2.8
6	2.1		2.4	1.6	.5	.5	1.1	1.6	1.2	1.5
7	3.6		3.9	4.2	3.9	2.7	3.4	3.2	2.6	3.1
$\bar{x}$	.95		1.1	1.0	.9	.7	.8	.9	.8	.8
S^2	3.8		4.2	4.0	3.6	2.8	3.3	3.5	3.2	3.4

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question E017 on which the total population response to "0", "Do Not Perform Task" was 79%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 10

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question P004

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	90.0	76.5	85.7	88.6	82.4	93.9	79.1	87.5	82.3	84.1	94.5	86.0
1	---	---	---	---	---	---	---	2.1	1.3	1.2	---	---
2	3.3	5.9	---	---	5.9	---	2.3	2.1	2.5	2.4	1.4	6.5
3	---	5.9	7.1	2.3	---	4.1	4.7	2.1	6.3	2.4	1.4	2.2
4	---	---	2.4	6.8	5.9	2.0	9.3	2.1	6.3	8.5	2.7	4.3
5	3.3	11.8	---	---	2.0	---	---	4.2	---	---	---	1.1
6	---	---	4.8	2.3	---	---	---	---	---	---	---	---
7	3.3	---	---	---	3.9	---	4.7	---	1.3	1.2	---	---
$\bar{x}$	.47	.90	.6	.48	.7	.2	.89	.42	.60	.56	.18	.42
S^2	2.7	3.1	2.4	1.9	3.1	.67	3.6	1.5	2.0	2.0	.60	1.3

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	83.7	84.1	82.1	88.8	86.1	88.3	83.6	83.3	86.9	86.0	88.8	83.8
1	3.1	---	2.8	1.1	---	---	.5	---	1.2	.9	---	.8
2	2.0	---	.9	---	1.3	1.3	4.1	3.3	2.0	.9	1.8	1.9
3	2.0	4.9	3.8	2.2	2.0	1.9	2.6	4.8	1.2	3.8	2.2	2.7
4	5.1	7.3	6.6	3.4	6.6	5.2	5.6	4.8	4.9	4.7	4.0	5.0
5	1.0	---	1.9	---	1.3	.6	1.0	.5	1.2	1.3	.4	2.3
6	---	1.2	---	2.2	2.0	---	.5	1.4	1.6	1.3	1.3	2.3
7	3.1	2.4	1.9	2.2	.7	2.6	2.1	1.9	.8	1.3	1.3	1.2
$\bar{x}$	.6	.68	.65	.51	.58	.51	.62	.65	.5	.56	.5	.6
S^2	2.5	2.8	2.5	2.4	2.3	2.2	2.4	2.5	2.0	2.2	2.0	2.7

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	84.3	86.3	87.3	85.7	84.7	87.1	88.1	86.9	86.6	85.7
1	1.0	.7	.3	1.0	.8	.5	.8	.4	.7	.7
2	2.0	1.3	2.1	2.9	2.8	2.2	2.1	2.8	2.1	2.5
3	3.8	4.9	1.8	2.9	3.1	3.2	2.4	3.2	2.5	2.8
4	4.8	3.9	4.2	3.8	5.3	4.1	3.6	3.6	4.4	4.6
5	1.4	1.3	2.4	2.2	1.5	1.0	.8	1.2	1.0	1.3
6	1.0	.7	.6	.6	1.0	.7	.9	1.0	1.0	.9
7	1.7	1.0	1.2	1.0	.8	1.2	1.3	1.0	1.6	1.5
$\bar{x}$	.6	.51	.5	.5	.56	.49	.45	.49	.5	.55
S^2	2.4	1.9	2.1	2.0	2.1	1.9	1.8	1.9	2.2	2.2

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question P004 on which the total population response to "0", "Do Not Perform Task" was 848. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 11

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question KC03

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	100.0	85.7	92.1	92.9	100.0	88.7	95.0	93.0	90.7	94.1	95.8	93.5
1	---	---	2.6	---	---	3.8	1.7	---	3.7	1.2	---	2.6
2	---	3.6	---	---	---	1.9	---	3.5	1.9	1.2	1.1	1.3
3	---	3.6	---	---	---	---	---	---	---	---	---	---
4	---	7.1	---	4.8	---	1.9	3.3	---	1.9	1.2	---	1.3
5	---	---	2.6	---	---	1.9	---	---	---	2.4	1.1	1.3
6	---	---	---	---	---	1.9	---	1.8	1.9	---	1.1	---
7	---	---	2.6	2.4	---	---	---	1.8	---	---	1.1	---
$\bar{x}$	.00	.46	.34	.36	.00	.36	.15	.29	.26	.20	.21	.17
S^2	.00	1.4	1.9	1.8	.00	1.5	.54	1.6	1.0	.81	1.2	.59

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	95.6	90.9	89.1	92.0	91.5	92.5	91.6	91.5	90.3	90.7	92.7	91.9
1	---	2.0	2.0	.9	.6	2.3	1.4	2.4	3.0	1.6	3.1	1.2
2	1.1	3.0	2.0	1.8	2.4	1.5	1.4	2.4	2.1	2.0	1.2	1.6
3	---	---	1.0	1.8	---	---	.5	.9	.8	.8	---	.4
4	3.3	3.0	1.0	1.8	3.6	2.3	3.3	2.4	1.7	3.2	1.9	2.4
5	---	1.0	4.0	1.8	.6	.8	.9	---	1.7	.8	---	1.2
6	---	---	2.0	---	.6	---	---	---	---	.4	.4	---
7	---	---	---	---	.6	.8	.9	.5	.4	.4	.8	1.2
$\bar{x}$	.15	.25	.39	.26	.31	.23	.29	.23	.28	.30	.21	.30
S^2	.55	.82	1.6	.91	1.3	.95	1.2	.77	1.0	1.1	.86	1.3

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	91.8	**	92.5	92.2	91.3	93.4	91.5	91.9	90.8	91.1
1	2.1		2.4	1.0	1.9	.7	1.9	1.6	1.9	1.9
2	1.1		1.8	1.6	1.7	1.9	1.5	1.8	1.5	2.0
3	.7		.3	---	.5	.5	.8	.4	.4	.4
4	2.9		1.5	2.6	3.2	2.4	2.6	3.2	3.1	2.6
5	.4		.9	1.3	.2	.5	.8	.6	1.0	.9
6	.7		.3	.6	.5	.2	.6	.2	.6	.6
7	.4		.3	.6	.7	.2	.4	.2	.7	.4
$\bar{x}$	.26		.21	.3	.28	.2	.27	.2	.31	.3
S^2	1.0		.8	1.3	1.5	.8	1.1	.9	1.3	1.1

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question KC03 on which the total population response to "0", "Do Not Perform Task" was 85%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 12

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question I013

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	96.7	82.1	86.8	88.1	86.5	84.9	91.7	91.2	88.9	92.9	91.6	93.5
1	---	3.6	---	---	2.7	---	---	1.8	---	2.4	1.1	1.3
2	---	---	---	2.4	2.7	1.9	---	1.8	---	---	1.1	---
3	---	---	---	---	---	---	1.7	---	---	---	---	---
4	---	7.1	---	---	5.4	11.3	3.3	1.8	5.6	3.5	2.1	3.9
5	---	---	2.6	---	---	---	---	1.8	1.9	---	2.1	---
6	3.3	3.6	2.6	2.4	---	---	---	---	---	1.2	---	1.3
7	---	3.6	7.9	7.1	2.7	1.9	3.3	1.8	3.7	---	2.1	---
$\bar{x}$	.2	.79	.84	.69	.49	.62	.42	.33	.57	.24	.37	.25
S^2	1.2	3.7	4.9	4.1	2.1	2.5	2.2	1.9	2.9	.97	1.8	1.1

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	86.8	89.9	86.1	86.6	87.9	91.7	87.9	87.7	84.4	86.6	88.4	88.2
1	4.4	1.0	2.0	1.8	1.2	.8	2.3	1.4	2.1	1.2	.8	2.0
2	1.1	1.0	---	.9	.6	.8	---	.5	.8	1.2	.8	.4
3	1.1	1.0	2.0	2.7	1.8	---	.9	1.4	1.3	.4	.4	.8
4	2.2	3.0	4.0	4.5	3.6	3.8	4.2	2.4	4.6	3.6	3.9	3.7
5	1.1	1.0	1.0	---	.6	.8	.5	.5	2.1	2.0	.8	.4
6	---	2.0	3.0	1.8	1.8	.8	1.4	1.4	1.7	1.6	2.3	1.6
7	3.3	1.0	2.0	1.8	2.4	1.5	2.8	4.7	3.0	3.2	2.7	2.8
$\bar{x}$	.47	.42	.6	.53	.53	.36	.52	.6	.67	.62	.56	.52
S^2	2.2	1.9	2.8	2.3	2.5	1.7	2.5	3.1	3.0	2.9	2.7	2.5

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	86.1	**	90.4	90.0	89.3	90.5	89.1	88.9	87.4	89.3
1	1.4		1.2	.6	1.0	1.7	1.7	1.4	1.7	1.5
2	1.4		.9	.3	1.0	1.0	1.1	1.0	1.0	1.0
3	1.4		.3	.3	.2	.7	.2	.4	.7	.4
4	5.0		2.4	3.2	3.9	2.4	3.2	2.6	3.6	3.6
5	2.1		2.1	2.3	1.0	1.0	1.1	1.2	1.4	1.0
6	1.1		1.2	1.0	1.7	1.2	1.9	1.0	1.5	1.2
7	1.4		1.5	2.3	1.9	1.5	1.7	3.4	2.8	1.9
$\bar{x}$	.56		.41	.48	.48	.38	.46	.51	.55	.44
S^2	2.3		1.97	2.4	2.3	1.7	2.2	2.6	2.6	2.1

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question I013 on which the total population response to "0", "Do Not Perform Task" was 88%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 13

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question B010

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	93.3	92.9	92.1	97.6	91.9	92.5	90.0	86.0	88.9	85.9	84.2	92.2
1	---	---	2.6	---	2.7	1.9	---	1.8	3.7	3.5	3.2	2.6
2	---	3.6	2.6	---	2.7	1.9	3.3	3.5	---	2.4	---	2.6
3	---	---	---	---	---	---	---	---	---	2.4	2.1	---
4	6.7	---	---	2.4	2.7	1.9	---	7.0	3.7	3.5	8.4	1.3
5	---	3.6	2.6	---	---	1.9	6.7	---	1.9	1.2	---	1.3
6	---	---	---	---	---	---	---	---	---	1.2	2.1	---
7	---	---	---	---	---	---	---	1.8	1.9	---	---	---
$\bar{x}$	.27	.25	.21	.09	.19	.23	.40	.49	.40	.42	.56	.19
S^2	1.0	1.0	.76	.38	.55	.83	1.7	1.9	1.8	1.5	2.0	.63

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	90.1	88.9	91.1	93.8	89.1	88.0	86.9	89.6	91.1	88.7	90.0	88.2
1	3.3	4.0	3.0	2.7	1.8	4.5	3.7	1.9	3.0	.8	3.5	3.3
2	2.2	2.0	1.0	---	3.6	3.0	2.8	2.4	1.3	1.6	1.2	.8
3	1.1	1.0	---	.9	.6	---	.5	---	.8	1.2	---	.4
4	2.2	4.0	3.0	.9	3.0	3.8	2.3	4.3	1.3	5.7	2.7	4.5
5	1.1	---	2.0	.9	.6	---	2.3	1.4	.8	1.2	1.2	1.2
6	---	---	---	---	1.2	.8	1.4	---	1.7	.4	1.2	1.6
7	---	---	---	.9	---	---	---	.5	---	.4	.4	---
$\bar{x}$	.25	.27	.27	.19	.30	.30	.40	.34	.27	.42	.32	.40
S^2	.79	.79	.98	.88	1.2	.95	1.5	1.3	1.1	1.6	1.3	1.5

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	91.4	**	87.5	91.6	89.6	89.3	88.0	90.3	90.0	88.5
1	1.4		3.6	2.9	3.6	2.2	3.2	2.6	3.1	3.4
2	1.4		3.0	.6	1.5	1.9	1.9	1.6	1.5	2.2
3	1.1		.6	---	.5	.7	.8	.4	.4	.7
4	2.9		2.7	2.6	3.6	2.7	3.8	3.0	2.9	3.5
5	1.1		.9	.6	.2	1.2	.9	1.2	.7	.9
6	.4		1.2	1.6	.7	1.2	1.1	.8	1.1	.7
7	.4		.6	---	.2	.7	.4	---	.3	.1
$\bar{x}$	.29		.38	.2	.29	.3	.38	.3	.31	.3
S^2	1.1		1.4	1.1	1.1	1.5	1.4	1.1	1.2	1.2

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question B010 on which the total population response to "0", "Do Not Perform Task" was 90%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 14

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question J003

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	100.0	89.3	92.1	92.9	89.2	86.8	95.0	89.5	92.6	91.8	88.4	94.8
1	---	---	---	---	5.4	1.9	---	1.8	---	1.2	2.1	---
2	---	---	---	---	---	---	---	1.8	---	1.2	---	---
3	---	---	---	---	---	---	---	1.8	---	---	---	1.3
4	---	---	---	---	2.7	9.4	5.0	1.8	3.7	3.5	4.2	2.6
5	---	---	---	---	---	---	---	1.8	---	---	1.1	---
6	---	3.6	5.3	---	---	---	---	---	1.9	---	---	1.3
7	---	7.1	2.6	7.1	2.7	1.9	---	1.8	1.9	2.4	4.2	---
$\bar{x}$	.00	.71	.5	.5	.35	.53	.2	.38	.39	.34	.54	.22
S^2	.00	4.4	3.0	3.3	1.7	2.2	.77	1.7	2.1	1.7	2.8	.96

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	90.1	87.9	88.1	90.2	89.7	91.0	85.5	89.6	89.0	91.1	89.6	92.3
1	1.1	2.0	2.0	---	1.2	.8	1.4	.9	1.7	.4	1.2	---
2	---	---	1.0	---	---	---	.5	.9	---	.8	.4	.4
3	---	---	1.0	.9	.6	---	.9	---	---	.4	---	.4
4	4.4	6.1	2.0	5.4	4.2	5.3	7.0	4.3	3.0	3.2	3.9	3.3
5	1.1	---	---	.9	1.1	---	.5	.9	.4	---	.4	---
6	---	2.0	---	---	.6	.8	.5	---	.8	.8	.8	.4
7	3.3	2.0	5.9	2.7	2.4	2.3	3.7	3.3	5.1	3.2	3.9	3.3
$\bar{x}$	.47	.52	.56	.47	.47	.42	.64	.48	.56	.44	.5	.4
S^2	2.4	2.5	3.1	2.3	2.3	2.1	2.9	2.4	3.1	2.3	2.6	2.2

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	89.6	**	89.6	89.3	90.0	88.6	88.5	89.3	88.5	90.5
1	1.4		1.2	.3	1.0	1.0	.9	1.2	1.0	1.2
2	.7		---	1.0	.2	1.0	.9	.4	.8	.3
3	---		---	.3	.2	.5	.2	---	.3	.3
4	2.9		5.1	4.2	4.1	3.9	4.7	4.2	4.0	3.6
5	.7		.3	1.3	1.5	1.0	.9	.4	.8	.7
6	1.4		.9	.3	.2	.5	.8	.6	.7	.9
7	3.2		3.0	3.2	2.7	3.6	3.0	3.8	3.9	2.5
$\bar{x}$	.49		.49	.5	.46	.5	.52	.5	.55	.4
S^2	2.5		2.4	2.5	2.3	2.6	2.5	2.6	2.7	2.2

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question J003 on which the total population response to "0", "Do Not Perform Task" was 90%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 15

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question L001

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	96.7	82.1	89.5	90.5	89.2	92.5	91.7	93.0	90.7	94.1	90.5	90.9
1	---	3.6	5.3	4.8	---	3.8	5.0	7.0	1.9	2.4	2.1	5.2
2	---	---	---	4.8	5.4	---	---	---	---	1.2	2.1	---
3	3.3	3.6	---	---	---	---	---	---	1.9	2.4	1.1	---
4	---	7.1	---	---	2.7	1.9	---	---	5.6	---	4.2	1.3
5	---	---	---	---	---	---	---	---	---	---	---	1.3
6	---	---	2.6	---	2.7	1.9	---	---	---	---	---	---
7	---	3.6	2.6	---	---	---	3.3	---	---	---	---	1.3
$\bar{x}$	.10	.68	.39	.14	.38	.23	.28	.07	.30	.11	.26	.26
S^2	.30	2.9	2.2	.22	1.5	.98	1.6	.06	1.0	.27	.81	1.2

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	87.9	90.9	93.1	92.9	92.7	92.5	91.1	89.6	94.9	93.1	90.7	91.1
1	4.4	2.0	4.0	1.8	2.4	2.3	1.9	4.7	3.0	2.4	4.4	3.3
2	---	3.0	1.0	1.8	1.2	1.5	1.4	1.4	.8	1.6	1.5	1.6
3	2.2	2.0	---	2.7	.6	1.5	.9	1.9	.4	1.2	.8	---
4	4.4	1.0	2.0	.9	1.8	---	2.8	1.4	.8	.8	1.9	2.8
5	---	---	---	---	.6	.8	.5	---	---	.4	---	.4
6	1.1	---	---	---	---	1.5	.5	---	---	---	.4	---
7	---	1.0	---	---	.6	---	.9	.9	---	.4	.4	.8
$\bar{x}$	.35	.25	.14	.17	.21	.23	.30	.26	.09	.17	.22	.26
S^2	1.2	.92	.38	.45	.83	.90	1.3	.90	.23	.60	.76	.99

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	90.4	**	92.5	91.6	90.3	90.0	90.8	89.5	90.0	90.5
1	3.6		2.4	3.2	4.4	4.4	3.2	3.2	3.5	3.4
2	1.4		.6	1.3	1.2	1.7	1.7	2.0	1.5	1.3
3	1.1		1.5	1.0	1.0	1.2	1.3	2.2	1.2	1.5
4	2.5		1.8	2.3	2.4	1.5	2.3	2.0	2.4	2.0
5	---		.6	.3	---	.5	.2	.2	.3	.3
6	.4		---	---	.5	.2	---	.4	.4	.4
7	.7		.6	.3	.2	.5	.6	.4	.7	.6
$\bar{x}$	.27		.22	.2	.24	.2	.24	.3	.28	.2
S^2	1.0		.86	.7	.80	.8	.84	.9	1.0	.9

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question L001 on which the total population response to "0", "Do Not Perform Task" was 92%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 16

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question A007

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	80.0	92.9	89.5	95.2	97.3	94.3	95.0	86.0	87.0	91.8	90.5	88.3
1	10.0	---	2.6	2.4	2.7	3.8	3.3	5.3	1.9	3.5	1.1	3.9
2	3.3	---	---	---	---	---	---	---	---	---	1.1	2.6
3	---	3.6	2.6	---	---	---	---	---	---	1.2	---	---
4	6.7	3.6	---	2.4	---	1.9	1.7	5.3	7.4	2.4	4.2	2.6
5	---	---	2.6	---	---	---	---	---	---	---	1.1	---
6	---	---	---	---	---	---	---	3.5	---	---	1.1	1.3
7	---	---	2.6	---	---	---	---	---	3.7	1.2	1.1	1.3
$\bar{x}$	.43	.25	.42	.12	.02	.12	.10	.47	.57	.25	.39	.36
S^2	1.2	.86	2.1	.40	.02	.33	.30	1.9	2.7	1.0	1.8	1.6

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	90.1	91.9	91.1	92.9	90.3	93.2	92.5	88.6	93.7	92.3	90.0	92.3
1	3.3	2.0	5.0	1.8	3.6	3.8	2.8	4.7	3.0	3.6	2.7	2.0
2	---	2.0	1.0	---	---	---	---	.5	---	.4	.4	.4
3	---	---	---	---	---	.8	---	1.4	---	.4	.8	---
4	3.3	---	1.0	4.5	3.0	1.5	2.3	3.3	1.3	.8	3.5	3.3
5	1.1	1.0	1.0	---	.6	---	.5	.5	1.3	.4	.8	.8
6	---	---	---	---	.6	---	.5	.5	.8	.8	1.5	.8
7	2.2	3.0	1.0	.9	1.8	.8	1.4	.5	---	1.2	.4	.4
$\bar{x}$	.37	.32	.23	.26	.35	.17	.27	.32	.19	.24	.36	.28
S^2	1.8	1.8	.94	1.1	1.7	.69	1.3	1.2	.82	1.1	1.5	1.2

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	91.1	**	90.4	91.9	91.5	89.5	90.6	89.7	91.1	90.8
1	3.9		3.6	2.3	2.7	3.4	3.2	4.0	3.3	3.5
2	.7		.3	---	.7	.5	.2	.4	.3	.3
3	---		.6	.3	.2	.5	.4	.6	.1	.1
4	3.9		3.0	3.2	2.7	2.9	3.6	2.6	3.1	2.9
5	.4		.6	1.0	---	.5	.2	.6	.4	.4
6	---		.6	.3	.7	1.2	.9	1.0	.8	.9
7	---		.9	1.0	1.5	1.5	.9	1.0	.8	1.0
$\bar{x}$	.23		.30	.3	.30	.37	.32	.3	.29	.3
S^2	.74		1.3	1.3	1.4	1.7	1.3	1.4	1.2	1.3

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question A007 on which the total population response to "0", "Do Not Perform Task" was 92%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 17

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question E022

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	90.0	89.3	86.8	97.6	97.3	88.7	85.0	94.7	83.3	94.1	95.8	93.5
1	6.7	---	2.6	2.4	---	1.9	1.7	1.8	7.4	2.4	1.1	1.3
2	---	---	2.6	---	2.7	1.9	1.7	---	1.9	---	1.1	1.3
3	---	---	2.6	---	---	---	---	---	---	1.2	---	1.3
4	---	10.7	2.6	---	---	5.7	6.7	1.8	3.7	---	1.1	1.3
5	3.3	---	---	---	---	---	---	1.8	1.9	---	1.1	---
6	---	---	---	---	---	---	---	---	---	1.2	---	1.3
7	---	---	2.6	---	---	1.9	5.0	---	1.9	1.2	---	---
$\bar{x}$	.23	.42	.45	.02	.05	.42	.67	.17	.48	.21	.12	.21
S^2	.87	1.6	1.9	.02	.11	1.8	3.2	.72	1.9	1.1	.47	.83

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	93.4	90.9	94.1	96.4	91.5	91.0	96.3	93.8	94.5	92.3	94.6	93.9
1	1.1	4.0	4.0	.9	1.2	3.0	1.4	2.4	2.1	2.4	1.2	1.6
2	2.2	1.0	1.0	---	2.4	.8	.5	1.4	.8	2.0	1.5	.8
3	---	---	---	---	1.2	.8	---	---	---	.8	---	---
4	1.1	2.0	1.0	1.8	1.2	3.8	.9	.9	.8	1.2	1.5	1.6
5	---	---	---	---	.6	---	.5	---	.4	.4	.4	.4
6	1.1	1.0	---	---	.6	---	.5	---	.4	.4	---	.4
7	1.1	1.0	---	.9	1.2	.8	---	1.4	.8	.4	.8	1.2
$\bar{x}$	.24	.27	.10	.14	.30	.27	.11	.19	.18	.21	.18	.23
S^2	1.2	1.2	.23	.72	1.3	1.0	.46	.89	.83	.78	.77	1.1

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	94.6	**	92.8	95.1	92.2	93.2	92.5	93.8	93.9	93.9
1	1.4		2.1	1.3	2.4	1.7	2.6	1.2	1.7	1.5
2	1.1		.9	.6	1.5	1.0	1.1	1.0	1.0	.9
3	---		.9	.6	.2	.7	.8	.6	.3	.4
4	1.1		1.5	1.3	1.7	1.7	1.9	1.8	1.5	1.5
5	.4		---	---	---	---	.2	.2	.3	.3
6	1.1		.6	.3	.7	1.0	.2	.8	.6	.6
7	.4		1.2	.6	1.2	.7	.8	.6	.8	1.0
$\bar{x}$	.19		.24	.16	.26	.24	.22	.22	.21	.23
S^2	.85		1.1	.7	1.1	1.0	.87	.9	.95	1.0

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question E022 on which the total population response to "0", "Do Not Perform Task" was 94% . Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 18

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question F044

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	100.0	96.4	94.7	100.0	100.0	100.0	93.3	94.7	90.7	97.6	93.7	96.1
1	---	3.6	2.6	---	---	---	1.7	5.3	---	1.2	1.1	1.3
2	---	---	2.6	---	---	---	1.7	---	1.9	1.2	1.1	---
3	---	---	---	---	---	---	1.7	---	---	---	2.1	1.3
4	---	---	---	---	---	---	1.7	---	7.4	---	2.1	1.3
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---
$\bar{x}$	.00	.04	.08	.00	.00	.00	.16	.05	.33	.03	.18	.10
S^2	.00	.04	.13	.00	.00	.00	.48	.05	1.2	.06	.55	.30

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	94.5	96.0	98.0	96.4	95.2	97.7	94.9	96.7	95.8	94.7	94.6	93.5
1	4.4	2.0	1.0	.9	1.8	---	1.9	.5	.8	1.2	1.9	2.4
2	---	---	---	---	---	---	.5	---	.4	.4	.4	---
3	---	1.0	---	---	.6	.8	.9	.9	1.3	.8	.4	.8
4	1.1	---	1.0	.9	1.8	1.5	.9	1.4	1.3	2.0	2.3	2.4
5	---	1.0	---	.9	.6	---	.5	.5	---	.8	.4	.8
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	.9	---	---	.5	---	.4	---	---	---
$\bar{x}$	.08	.10	.05	.15	.14	.08	.15	.10	.14	.16	.15	.18
S^2	.21	.34	.17	.80	.50	.30	.60	.42	.50	.60	.52	.66

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	96.4	**	95.2	95.8	95.6	98.6	96.1	95.8	95.4	96.1
1	1.1		1.2	1.3	1.9	1.0	1.5	1.4	1.7	1.8
2	.7		.3	---	---	---	.6	.4	.3	.4
3	.7		.9	1.3	.2	.7	.4	.6	.7	.6
4	---		1.5	.6	1.5	1.0	.8	1.0	1.2	.7
5	.7		.6	1.0	.5	.3	.4	.4	.4	.1
6	---		---	---	---	---	---	---	---	---
7	.4		.3	---	.2	---	.4	.4	.3	.3
$\bar{x}$	.10		.15	.13	.13	.09	.11	.13	.13	.10
S^2	.45		.61	.46	.50	.34	.46	.50	.51	.37

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question F044 on which the total population response to "0", "Do Not Perform Task" was 963. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 19

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question G023

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	100.0	92.9	94.7	95.2	100.0	98.1	96.7	96.5	98.1	100.0	98.9	96.1
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	1.3
4	---	3.6	---	2.4	---	---	1.7	1.8	1.9	---	---	---
5	---	---	---	---	---	---	---	---	---	---	1.1	---
6	---	---	---	---	---	---	---	1.8	---	---	---	1.3
7	---	3.6	5.3	2.4	---	1.9	1.7	---	---	---	---	1.3
$\bar{x}$	.00	.39	.37	.26	.00	.13	.18	.18	.07	.00	.05	.20
S^2	.00	2.2	2.5	1.5	.00	.93	1.06	.90	.30	.00	.26	1.2

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	96.7	94.9	97.0	96.4	98.2	97.7	98.1	98.1	97.9	98.0	96.5	98.8
1	---	1.0	---	.9	---	---	---	---	---	.4	.4	---
2	---	---	1.0	---	---	---	.5	---	---	---	.4	.4
3	---	---	---	---	---	---	---	.5	---	---	---	---
4	1.1	1.0	1.0	.9	.6	1.5	.5	---	.4	---	.8	.4
5	1.1	1.0	---	.9	---	---	---	---	.4	---	.8	---
6	---	1.0	---	---	---	---	---	.9	---	.8	---	---
7	1.1	1.0	1.0	.9	1.2	.8	.9	.5	1.3	.8	1.2	.4
$\bar{x}$	.17	.23	.13	.15	.11	.11	.09	.10	.13	.10	.16	.05
S^2	.97	1.2	.67	.80	.68	.60	.54	.60	.78	.70	.88	.28

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	96.8	**	99.1	98.4	97.1	97.6	98.3	97.0	97.5	97.7
1	---		---	.3	.5	.2	---	.2	.1	.1
2	---		---	.3	.2	---	.2	.2	.1	---
3	---		---	---	.2	---	.2	.2	.1	.1
4	.7		.6	---	.5	.7	.4	.6	.6	.7
5	.4		---	---	---	.2	.2	.4	.3	---
6	.4		---	---	.5	---	.2	.4	.4	.3
7	1.8		.3	1.0	1.0	1.2	.6	1.0	.8	1.0
$\bar{x}$	.19		.04	.07	.13	.13	.8	.15	.12	.12
S^2	1.17		.2	.48	.75	.7	.46	.8	.7	.7

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question G023 on which the total population response to "0", "Do Not Perform Task" was 98%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

TABLE 20

Stability of Task Analysis Questionnaire Responses at Various Levels of Sample Size

A Comparison of Percentage of Response on a 0 to 7 Scale in Random Samples of Equal Size for N's Ranging from 30 to 700*

Task Analysis Inventory for OF 40, Question F082

Response Categories	N=30		N=40		N=50		N=60		N=70		N=80	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	100.0	100.0	100.0	100.0	97.3	100.0	98.3	100.0	96.3	97.3	97.9	98.7
1	---	---	---	---	---	---	1.7	---	3.7	---	1.1	1.3
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	1.1	---
4	---	---	---	---	---	---	---	---	---	1.2	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	1.2	---	---
7	---	---	---	---	2.7	---	---	---	---	---	---	---
$\bar{x}$	.00	.00	.00	.00	.19	.00	.01	.00	?	.10	.04	.01
S^2	.00	.00	.00	.00	1.3	.00	.01	.00	?	.60	.10	.01

	N=90		N=100		N=150		N=200		N=230		N=250	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	98.9	98.0	100.0	97.3	99.4	99.2	98.6	100.0	99.2	98.8	98.5	98.8
1	---	---	---	---	---	---	---	---	.8	.4	.4	.4
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	1.0	---	.9	.6	---	---	---	---	---	.4	---
4	---	---	---	.9	---	.8	.9	---	---	.4	.8	.4
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	.9	---	---	.5	---	---	.4	---	.4
7	1.1	1.0	---	---	---	---	---	---	---	---	---	---
$\bar{x}$	.07	.10	.00	.11	.02	.03	.06	.00	.008	.04	.04	.04
S^2	.53	.58	.00	.54	.05	.12	.32	.00	.008	.21	.16	.21

	N=300		N=320		N=400		N=500		N=700	
	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2	%S1	%S2
0	98.2	**	99.1	99.4	98.5	99.0	99.2	99.4	99.0	99.3
1	.4		.3	---	.2	.5	.2	---	.1	---
2	.4		---	.3	.2	---	---	---	.1	---
3	---		---	---	.2	---	.2	---	.1	---
4	.7		---	.3	.5	---	.4	.4	.4	.4
5	---		---	---	---	---	---	---	---	---
6	---		.3	---	.2	.2	---	---	---	.1
7	.4		.3	---	---	.2	---	.2	.1	.1
$\bar{x}$	.06		.04	.02	.04	.04	.02	.03	.03	.04
S^2	.30		.25	.06	.19	.2	.08	.16	.15	.19

* Samples were drawn from a population of 925 Marines who completed the OF 40 Task Analysis Inventory. This Table compares equal size random samples, S1 & S2, for each level of N, showing percentage of responses (%S1, %S2) to Question F082 on which the total population response to "0", "Do Not Perform Task" was 99%. Other response categories range from "1", "Very Little Time Spent on Task" to "7", "Very Much Time Spent on Task". Sampling procedure used was random selection with replacement.

** Sample S2, N=300, was lost in computer due to systems error.

APPENDIX B

REPRESENTATIVE DATA FROM APPLICATIO.
OF STABILITY TEST TO OF 41 TASK
INVENTORY RESPONSES

APPENDIX B

Stability Tests for Five Different Sample Sizes Compared with Observed Frequencies in Terms of Percentage of Responses on 0 to 7 Scale for Representative Task Statements in Each of Ten Duty Areas of Occupational Field 41 (OF 41)*

Task Statement 228, Duty Area A

Response Categories	Stability Test Sample Sizes										Observed Frequencies
N=	50		100		200		400		500		310
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	92.0	88.0	94.0	90.0	92.0	90.5	91.5	91.2	90.2	91.2	90.6
1	--	2.0	1.0	2.0	1.0	--	.7	.7	1.0	1.0	1.0
2	--	2.0	--	1.0	--	1.0	1.0	.7	1.2	.8	1.0
3	--	--	--	--	--	--	.5	.2	.4	.6	.3
4	4.0	8.0	5.0	3.0	4.5	5.5	3.5	3.7	4.2	3.8	3.9
5	--	--	--	--	--	--	--	--	--	--	--
6	2.0	--	--	--	--	.5	.5	.7	.6	.4	.6
7	2.0	--	--	4.0	2.5	2.5	2.2	2.5	2.6	2.4	2.6
$\bar{X}$	.42	.38	.21	.44	.37	.45	.37	.40	.44	.39	.413
s^2	2.21	1.26	.78	2.33	1.83	2.14	1.81	2.00	2.07	1.88	2.03

Task Statement 60, Duty Area B

Response Categories	Stability Test Sample Sizes										Observed Frequencies
N=	50		100		200		400		500		310
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	24.0	52.0	38.0	33.0	37.2	38.5	35.5	32.8	34.2	33.6	33.9
1	--	4.0	5.0	9.0	3.0	5.5	4.0	4.3	4.6	5.0	4.5
2	2.0	--	--	--	1.5	--	2.0	2.3	2.0	2.2	1.9
3	6.0	--	--	1.0	3.0	2.0	1.7	3.0	2.6	2.4	2.6
4	22.0	18.0	21.0	16.0	19.6	21.5	21.5	23.0	21.8	22.6	22.3
5	4.0	--	7.0	2.0	7.0	4.5	4.7	4.2	4.2	4.2	4.8
6	2.0	2.0	3.0	1.0	2.5	5.0	3.7	3.5	3.4	3.8	3.5
7	40.0	24.0	26.0	38.0	26.1	23.0	26.2	27.0	27.0	26.2	26.5
$\bar{X}$	4.22	2.56	3.24	3.58	3.27	3.11	3.31	3.41	2.44	3.35	3.36
s^2	7.81	9.03	8.57	9.50	8.34	8.24	8.29	8.03	6.08	8.08	8.12

*Two samples of item responses for each level of N were selected for each of five sample sizes. For example, using the random method with item replacement, two samples with N = 50 were drawn, two samples for N = 100, and similarly for N's of 200, 400 and 500. Percentage of responses on the 0 to 7 scale are shown for each pair of samples (A & B) under each of the five sizes of N used for testing stability of responses at each level of N. The column to the far right in each example shows the percentage of responses on the 0 to 7 scale actually obtained through administration of the OF 41 Task Inventory.

Task Statement 299, Duty Area C

Stability Test Sample Sizes

Response Categories	N= 50		100		200		400		500		Observed Frequencies 310
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	62.0	72.0	85.0	78.0	81.4	85.0	81.0	79.8	80.2	80.6	80.0
1	6.0	2.0	3.0	4.0	4.5	4.5	4.0	4.4	4.0	4.2	4.5
2	2.0	--	--	1.0	1.5	.5	1.2	.7	1.4	1.2	1.3
3	--	--	--	1.0	1.5	.5	--	.9	1.0	1.0	1.0
4	14.0	18.0	5.0	4.0	4.0	2.5	6.0	5.4	5.4	5.2	5.5
5	--	--	--	--	.5	--	.5	.7	1.0	1.0	.6
6	--	--	--	--	.5	--	1.0	.7	1.0	.8	.6
7	16.0	8.0	8.0	12.0	6.0	7.0	6.3	6.7	5.9	6.2	6.5
$\bar{X}$	.308	.208	.79	1.08	.759	.66	.83	.87	.85	.84	.84
s^2	6.38	7.94	4.14	5.68	3.58	3.53	3.93	4.08	3.90	3.89	3.92

Task Statement 61, Duty Area D

Stability Test Sample Sizes

Response Categories	N= 50		100		200		400		500		Observed Frequencies 310
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	58.0	62.0	52.0	55.0	52.0	49.2	50.2	49.3	49.2	50.4	49.7
1	--	--	1.0	1.0	3.0	3.5	3.0	3.2	3.0	2.8	2.9
2	6.0	--	2.0	--	1.5	2.0	2.8	2.2	2.4	2.2	2.3
3	2.0	--	2.0	--	.5	2.5	2.2	2.7	2.6	3.0	2.6
4	16.0	24.0	15.0	19.0	17.5	14.6	16.5	17.2	17.8	17.0	17.4
5	4.0	2.0	2.0	5.0	4.5	4.5	4.2	3.7	3.1	3.0	3.5
6	--	--	3.0	7.0	3.5	5.0	3.2	3.5	3.5	3.8	4.2
7	14.0	12.0	23.0	13.0	17.6	18.6	17.7	18.0	18.1	17.8	17.4
$\bar{X}$	2.00	1.90	2.60	2.35	2.44	2.56	2.47	2.51	2.52	2.47	2.49
s^2	6.98	6.75	8.85	7.75	8.01	8.19	7.87	7.88	7.90	7.88	7.86

Task Statement 107, Duty Area E

Stability Test Sample Sizes

Response Categories	N= 50		100		200		400		500		Observed Frequencies 310
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	--	--	33.0	35.0	31.2	34.0	30.7	31.3	31.7	31.3	31.9
1	--	--	7.0	5.0	5.5	4.0	4.7	4.2	4.1	5.3	5.2
2	--	--	1.0	3.0	3.0	3.5	3.0	3.2	2.6	2.5	2.6
3	--	--	--	--	2.0	--	1.2	1.0	1.1	1.3	1.6
4	--	--	21.0	16.0	17.6	19.5	19.5	18.7	17.1	17.1	17.7
5	--	--	3.0	2.0	3.5	2.5	4.5	4.2	4.5	4.6	4.5
6	--	--	6.0	4.0	5.5	4.5	6.0	5.7	5.5	5.9	5.8
7	--	--	29.0	35.0	31.7	32.0	30.1	31.5	32.7	30.9	30.6
$\bar{X}$	--	--	3.47	3.6	3.6	3.53	3.63	3.65	3.68	--	3.58
s^2	--	--	8.64	9.2	8.6	8.85	8.37	8.53	8.72	--	8.58

Task Statement 152, Duty Area F

Stability Test Sample Sizes | Observed Frequencies

Response Categories	N= 50		100		200		400		500		310
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	68.0	72.0	70.0	72.0	77.4	75.5	75.0	76.3	75.4	74.8	75.8
1	2.0	--	--	1.0	2.5	1.5	2.2	1.7	2.5	2.6	2.3
2	--	--	1.0	2.0	2.0	3.0	1.9	1.4	1.5	1.8	1.9
3	2.0	--	--	--	1.0	.5	.7	.7	.9	.8	1.0
4	16.0	22.0	12.0	7.0	5.0	8.0	8.4	7.9	7.3	7.3	7.4
5	--	--	1.0	1.0	1.5	--	1.7	1.2	1.5	1.6	1.6
6	2.0	--	--	2.0	1.5	.5	.4	.9	1.3	1.4	1.3
7	10.0	10.0	16.0	15.0	9.0	11.0	8.9	9.7	8.7	8.5	8.7
$\bar{X}$	1.54	1.52	1.67	1.59	1.09	1.21	1.18	1.19	1.17	1.16	1.15
s^2	6.14	5.91	7.34	7.34	5.17	5.60	5.20	5.44	5.24	5.20	5.19

Task Statement 93, Duty Area G

Stability Test Sample Sizes | Observed Frequencies

Response Categories	N= 50		100		200		400		500		310
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	38.0	42.0	38.0	41.0	36.0	39.5	36.5	36.0	37.7	36.8	36.8
1	--	8.0	7.0	5.0	9.0	7.0	6.7	7.2	6.2	5.8	6.8
2	2.0	--	3.0	--	1.5	3.0	2.2	2.8	2.6	2.6	2.6
3	--	--	1.0	--	--	--	--	.5	.4	.2	.6
4	10.0	2.0	13.0	16.0	17.5	19.0	18.8	17.7	18.5	18.6	18.1
5	2.0	6.0	1.0	--	3.5	2.0	3.2	3.5	2.0	2.4	2.9
6	12.0	--	4.0	9.0	5.5	4.5	5.7	4.7	5.2	5.4	5.2
7	38.0	44.0	33.0	29.0	27.0	25.0	26.7	27.5	27.2	28.2	27.1
$\bar{X}$	3.85	3.28	3.38	3.26	3.22	3.02	3.25	3.24	3.19	3.28	3.2
s^2	10.06	11.19	9.5	9.53	8.75	8.58	8.66	8.67	8.75	8.79	8.6

Task Statement 56, Duty Area M

Stability Test Sample Sizes | Observed Frequencies

Response Categories	N= 50		100		200		400		500		310
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	54.0	38.0	37.0	42.0	36.7	38.0	36.7	39.5	35.8	36.2	35.2
1	10.0	24.0	10.0	7.0	7.5	10.5	9.0	9.3	8.5	9.4	9.0
2	4.0	--	1.0	--	4.5	3.5	3.3	3.0	4.7	5.0	4.5
3	--	--	2.0	--	4.0	2.0	3.0	3.5	3.6	3.4	3.9
4	12.0	20.0	21.0	19.0	20.6	16.5	20.8	18.7	19.4	20.6	20.3
5	--	2.0	3.0	3.0	2.5	3.0	3.5	4.2	3.8	3.2	3.5
6	6.0	4.0	8.0	12.0	6.0	6.0	6.5	5.3	6.6	6.0	6.5
7	14.0	12.0	18.0	17.0	18.1	20.5	17.3	16.5	17.2	16.8	17.1
$\bar{X}$	2.00	2.22	2.88	2.89	2.86	2.84	2.85	2.69	2.88	2.83	2.87
s^2	7.35	6.46	7.706	8.24	7.4	8.00	7.39	7.35	7.34	7.21	7.23

Task Statement 56 , Duty Area S

Stability Test Sample Sizes

Response Categories	N= 50		100		200		400		500		Observed Frequencies 310
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	54.0	42.0	48.0	43.0	42.0	43.7	43.5	44.5	44.6	43.4	44.2
1	--	8.0	--	5.0	5.5	3.5	4.0	3.7	3.8	4.2	3.9
2	2.0	4.0	3.0	1.0	3.0	5.0	4.5	4.5	4.8	3.8	4.2
3	--	4.0	3.0	7.0	1.5	3.5	3.0	3.5	4.2	4.0	3.5
4	26.0	12.0	17.0	22.0	23.0	19.6	21.3	19.7	19.4	20.6	20.6
5	4.0	--	3.0	2.0	4.5	3.5	3.5	3.7	3.2	3.0	3.2
6	--	2.0	5.0	5.0	4.5	4.5	3.3	3.7	3.8	4.2	3.9
7	14.0	20.0	21.0	15.0	16.0	16.6	17.2	16.3	16.2	16.8	16.5
$\bar{X}$	2.26	2.48	2.75	2.61	2.70	2.6	2.64	2.60	2.56	2.64	2.6
s^2	7.14	8.21	8.48	7.15	7.35	7.42	7.40	7.34	7.29	7.39	7.35

Task Statement 236, Duty Area W

Stability Test Sample Sizes

Response Categories	N= 50		100		200		400		500		Observed Frequencies 310
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	98.0	96.0	96.0	95.0	92.5	94.5	93.5	92.5	92.2	93.4	92.6
1	2.0	2.0	2.0	--	4.5	2.0	2.5	3.0	3.0	2.6	3.2
2	--	--	--	1.0	.5	.5	1.0	1.25	1.0	1.2	1.0
3	--	--	--	--	--	--	.5	.2	.4	.4	.3
4	--	2.0	1.0	3.0	2.0	2.5	2.0	2.25	2.2	1.8	1.9
5	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	.5	--	--	.25	.4	.4	.3
7	--	--	1.0	1.0	--	.5	.5	.7	.4	.4	.6
$\bar{X}$	.02	.10	.13	.21	.17	.17	.18	.22	.21	.19	.203
s^2	.02	.34	.66	.98	.54	.67	.65	.88	.77	.71	.803

APPENDIX C

REPRESENTATIVE DATA FROM

STABILITY TESTS OF RESPONSES

TO OF 43 TASK INVENTORY

APPENDIX C

Stability Tests for Five Different Sample Sizes Compared with Observed Frequencies in Terms of Percentage of Responses on 0 to 7 Scale for Representative Task Statements in Each of Ten Duty Areas of Occupational Field 43 (OF 43)*

Task Statement 228, Duty Area A

	Stability Test Sample Sizes										Observed Frequencies
N=	50		100		200		300		400		228
Response Categories	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	58.0	74	77.0	84.0	84.0	81.9	83.4	78.6	80.5	81.0	80.7
1	--	2.0	1.0	--	1.0	1.5	.6	1.3	1.7	1.2	1.3
2	--	--	--	2.0	--	.5	1.3	1.3	1.5	1.0	.9
3	--	2.0	2.0	--	1.0	1.0	.9	1.6	1.0	.25	1.3
4	18.0	10.0	7.0	9.0	7.0	5.6	5.6	7.0	7.0	6.5	7.0
5	4.0	2.0	2.0	--	1.5	2.1	1.3	2.0	1.7	2.5	1.8
6	36.0	8.0	5.0	2.0	2.0	2.5	2.6	2.3	2.2	2.7	2.6
7	14.0	4.0	6.0	3.0	2.5	4.6	3.9	5.6	4.3	5.0	4.4
X	2.3	1.31	1.17	.73	.70	.87	.79	1.01	.88	.93	.904
s^2	7.9	5.3	5.23	3.2	3.1	4.02	3.67	4.45	3.86	4.27	4.026

Task Statement 81, Duty Area A

	Stability Test Sample Sizes										Observed Frequencies
N=	50		100		200		300		400		228
Response Categories	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	22.0	28.0	38.0	20.0	34.5	29.0	31.3	32.1	30.3	31.3	31.1
1	4.0	--	5.0	6.0	2.5	3.5	4.0	3.0	4.0	3.2	3.5
2	8.0	2.0	4.0	3.0	4.5	4.0	5.0	4.3	5.1	5.2	4.8
3	2.0	2.0	4.0	2.0	1.5	3.0	3.1	2.3	2.7	2.9	3.1
4	26.0	30.0	18.0	26.0	16.0	15.5	16.8	15.5	16.4	15.4	16.2
5	18.0	14.0	10.0	7.0	7.5	8.5	6.9	8.1	8.5	7.9	7.9
6	8.0	6.0	6.0	5.0	6.5	7.0	8.4	9.1	8.3	8.4	8.3
7	12.0	18.0	15.0	31.0	26.5	24.5	24.5	25.3	24.4	25.3	25.0
X	3.5	3.5	2.8	4.04	3.4	3.6	3.5	3.5	3.5	3.5	3.5
s^2	5.56	6.57	7.2	7.01	8.4	7.9	8.2	7.8	7.8	8.04	7.9

*Two samples of item responses for each level of N were selected for each of five sample sizes. For example, using the random method with item replacement, two samples with N = 50 were drawn, two samples for N = 100, and similarly for N's of 200, 300 and 400. Percentage of responses on the 0 to 7 scale are shown for each pair of samples (A & B) under each of the five sizes of N used for testing stability of responses at each level of N. The column to the far right in each example shows the percentage of responses on the 0 to 7 scale actually obtained through administration of the OF 43 Task Inventory.

Task Statement 221 , Duty Area B

Response Categories	Stability Test Sample Sizes N= 50 A %	50 B %	100 A %	100 B %	200 A %	200 B %	300 A %	300 B %	400 A %	400 B %	Observed Frequencies 228 %
0	98.0	100.0	99.0	99.0	99.0	98.5	98.3	99.0	98.2	97.5	97.4
1	--	--	1.0	--	--	.5	.3	--	.5	.75	.4
2	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	.5	.3	--	.5	.25	.4
4	--	--	--	--	--	.5	.3	.6	.25	.75	.4
5	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	.5	--	.3	.3	.25	.25	.9
7	2.0	--	--	1.0	.5	--	.3	--	--	.75	.4
X	.14	0.0	.01	.06	.07	.04	.07	.05	.06	.10	.118
s^2	.98	0.0	.01	.36	.42	.13	.37	.23	.27	.48	.633

Task Statement 58, Duty Area G

Response Categories	Stability Test Sample Sizes N= 50 A %	50 B %	100 A %	100 B %	200 A %	200 B %	300 A %	300 B %	400 A %	400 B %	Observed Frequencies 228 %
0	100.0	98.0	100.0	98.0	99.0	98.5	97.3	96.8	97.2	97.7	97.4
1	--	--	--	1 0	--	--	.3	.6	.5	.5	.4
2	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--
4	--	2.0	--	1.0	1.0	1.0	1.3	1.6	1.2	1.5	1.3
5	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	.5	1.0	1.0	1.0	.5	.9
7	--	--	--	--	--	--	--	--	--	--	--
X	0.0	.08	0.0	.05	.04	.07	.12	.13	.12	.09	.110
s^2	0.0	.32	0.0	.17	.16	.34	.56	.62	.55	.42	.521

Task Statement 5 , Duty Area J

Response Categories	Stability Test Sample Sizes N= 50 A %	50 B %	100 A %	100 B %	200 A %	200 B %	300 A %	300 B %	400 A %	400 B %	Observed Frequencies 228 %
0	40.0	64.0	52.0	47.0	54.0	56.0	49.6	51.3	51.5	51.1	50.4
1	16.0	10.0	15.0	18.0	9.5	11.0	11.3	10.3	10.7	11.0	11.0
2	10.0	4.0	9.0	11.0	7.5	8.0	7.3	7.6	8.2	7.3	7.0
3	4.0	--	3.0	4.0	3.5	3.0	4.0	4.0	4.2	4.7	3.9
4	20.0	8.0	17.0	12.0	20.5	17.5	21.0	20.6	19.5	20.0	21.5
5	6.0	8.0	4.0	2.0	2.0	1.5	2.6	2.3	2.7	2.3	2.6
6	4.0	4.0	--	3.0	2.5	2.0	3.0	2.3	2.7	2.0	2.6
7	0	2.0	--	2.0	.5	1.0	1.0	1.3	1.5	1.2	.9
X	1.8	1.28	1.3	1.43	1.46	1.33	1.6	1.5	1.57	1.3	1.57
s^2	3.82	4.41	2.84	3.49	3.54	3.35	3.81	3.75	3.83	3.64	3.74

Task Statement 86, Duty Area M

Response Categories	Stability Test Sample Sizes N= 50 A %	50 B %	100 A %	100 B %	200 A %	200 B %	300 A %	300 B %	400 A %	400 B %	Observed Frequencies 228 %
0	84.0	90.0	79.0	84.0	74.8	74.1	69.3	70.6	71.7	70.1	71.5
1	--	--	1.0	--	.5	1.5	1.6	1.3	1.9	2.0	1.3
2	2.0	--	2.0	--	2.5	1.0	4.3	3.6	2.8	3.7	3.1
3	--	3.0	2.0	4.0	3.0	4.6	5.0	2.6	4.3	4.8	4.4
4	6.0	--	5.0	1.0	8.5	7.7	9.0	7.9	7.4	8.3	8.3
5	--	1.0	--	3.0	2.0	3.1	1.6	2.6	2.8	2.3	2.6
6	--	1.0	4.0	2.0	3.0	1.5	3.3	4.9	4.1	3.3	3.5
7	8.0	--	7.0	6.0	5.5	6.2	5.6	6.2	5.2	4.7	5.3
X	.84	.4	1.04	.85	1.16	1.17	1.29	1.35	1.25	1.22	1.25
s^2	4.34	1.63	4.92	4.25	4.73	4.76	4.82	5.37	4.88	4.56	4.82

Task Statement 238, Duty Area P

Response Categories	Stability Test Sample Sizes N= 50 A %	50 B %	100 A %	100 B %	200 A %	200 B %	300 A %	300 B %	400 A %	400 B %	Observed Frequencies 228 %
0	68.0	76.0	58.0	66.0	68.0	64.0	58.4	64.1	62.8	64.8	64.8
1	--	2.0	5.0	8.0	3.5	4.5	4.6	2.3	4.2	5.2	4.4
2	2.0	2.0	4.0	2.0	2.0	4.5	4.3	3.3	4.6	3.7	3.9
3	6.0	2.0	8.0	4.0	5.0	6.0	5.9	4.4	6.5	5.3	5.7
4	4.0	--	4.0	10.0	7.5	8.5	7.5	8.7	8.3	6.8	7.5
5	--	5.0	5.0	1.0	3.0	1.0	2.9	3.7	2.4	3.0	2.6
6	12.0	2.0	9.0	7.0	6.0	5.0	7.2	6.4	5.8	5.3	6.1
7	3.0	2.0	6.0	2.0	5.0	6.5	9.1	7.0	5.6	5.3	5.7
X	1.55	1.14	1.76	1.25	1.39	1.46	1.83	1.63	1.53	1.40	1.49
s^2	6.42	4.98	6.06	4.35	5.23	5.25	6.45	5.98	5.29	5.08	5.37

Task Statement 230, Duty Area R

Response Categories	Stability Test Sample Sizes N= 50 A %	50 B %	100 A %	100 B %	200 A %	200 B %	300 A %	300 B %	400 A %	400 B %	Observed Frequencies 228 %
0	24.0	22.0	31.0	47.0	46.2	52.3	47.3	49.5	47.7	46.8	47.4
1	12.0	4.0	8.0	5.0	6.0	4.6	5.6	4.0	4.6	6.5	5.7
2	4.0	6.0	5.0	6.0	4.5	5.6	4.6	3.9	5.6	5.5	4.8
3	18.0	10.0	7.0	4.0	5.5	3.5	5.0	5.9	6.1	5.2	5.3
4	20.0	8.0	14.0	19.0	14.5	12.3	13.0	11.4	12.8	13.8	13.6
5	4.0	--	9.0	3.0	4.0	3.0	5.6	4.9	4.5	6.5	4.4
6	6.0	14.0	11.0	7.0	6.5	7.6	7.6	9.1	6.9	7.1	6.6
7	12.0	16.0	13.0	9.0	13.0	10.7	10.3	11.1	11.0	6.5	12.3
X	2.94	2.74	3.03	2.25	2.40	2.13	2.3	2.33	2.31	2.2	2.32
s^2	5.61	7.99	6.94	6.37	7.06	6.89	6.82	7.15	6.87	6.83	6.98

Task Statement 172, Duty Area R

Stability Test Sample Sizes — Observed Frequencies

Response Categories	N= 50		100		200		300		400		228
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	30.0	22.0	34.0	26.0	32.5	30.6	29.8	31.8	30.1	30.8	30.7
1	--	4.0	3.0	7.0	4.0	4.8	5.2	5.0	4.4	4.9	4.4
2	12.0	6.0	7.0	9.0	6.0	3.7	5.6	4.1	6.1	5.6	5.7
3	--	8.0	2.0	5.0	4.0	3.2	2.9	4.1	3.4	3.9	3.9
4	22.0	16.0	23.0	19.0	20.5	19.3	19.8	18.9	19.3	18.7	19.3
5	8.0	4.0	8.0	4.0	5.5	6.9	6.6	8.1	6.4	6.6	6.6
6	14.0	6.0	8.0	10.0	9.5	11.2	11.2	10.5	10.6	11.3	10.5
7	16.0	32.0	15.0	20.0	18.0	20.9	18.5	21.3	19.3	18.5	18.9
X	3.41	3.92	3.08	3.36	3.21	3.45	3.35	3.41	3.36	3.32	3.32
s^2	7.01	7.66	6.98	7.1	7.3	7.59	7.29	7.54	7.35	7.33	7.3

Task Statement 12, Duty Area S

Stability Test Sample Sizes — Observed Frequencies

Response Categories	N= 50		100		200		300		400		228
	A %	B %	A %	B %	A %	B %	A %	B %	A %	B %	%
0	36.0	28.0	67.0	78.0	78.5	75.7	73.9	72.9	73.2	74.3	73.7
1	14.0	6.0	11.0	6.0	6.0	7.0	6.4	7.1	5.9	5.5	6.1
2	18.0	24.0	6.0	7.0	4.0	6.5	5.7	6.1	4.9	6.2	5.7
3	10.0	8.0	2.0	2.0	3.0	2.5	2.7	2.9	3.2	2.5	3.1
4	16.0	28.0	9.0	5.0	7.0	5.0	7.1	7.4	8.1	7.2	7.5
5	2.0	4.0	2.0	--	1.0	1.5	1.3	1.6	1.7	1.0	1.3
6	--	2.0	1.0	--	.5	--	1.0	.3	.7	.5	.9
7	4.0	2.0	2.0	2.0	--	1.5	1.7	1.3	1.9	2.0	1.8
X	1.82	2.28	.95	.6	.56	.66	1.41	.78	.85	.78	.807
s^2	3.54	3.47	2.94	1.96	1.68	2.06	2.95	2.35	2.81	2.62	2.62

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